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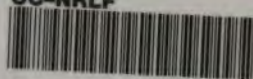
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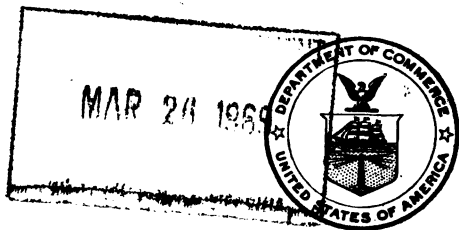
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105 DEPARTMENT OF COMMERCE,  
OFFICE OF THE SECRETARY

ADVISORY CONFERENCE ON THE SUBJECT  
OF MAKING PASSENGER VESSELS MORE  
SECURE FROM DESTRUCTION BY FIRE

*Paul  
ep*



HELD IN THE  
OFFICE OF THE SECRETARY OF COMMERCE  
WASHINGTON, WEDNESDAY, MAY 3, 1916



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1916

## LIST OF PERSONS WHO ATTENDED THE ADVISORY CONFERENCE.

- Hon. WILLIAM C. REDFIELD, Secretary of Commerce (presiding).  
Hon. EDWIN F. SWEET, Assistant Secretary of Commerce.  
Mr. E. C. GILLETTE, Superintendent of Naval Construction, Bureau of Lighthouses, Washington, D. C.  
N. SUMNER MYRICK, Esq., Chamber of Commerce of the United States, Washington, D. C.  
Hon. WILLIAM B. WILSON, Secretary of Labor.  
Mr. JAMES L. ACKERSON, Naval Constructor, Navy Department, Washington, D. C.  
Mr. SAMUEL GOMPERS, President, American Federation of Labor, Washington, D. C.  
Mr. ANDREW FURUSETH, President, Seamen's Union, San Francisco, Cal.  
Mr. A. W. GOODRICH, Goodrich Transit Co., Chicago, Ill..  
Mr. WILLARD THOMPSON, Vice President and General Manager, B. C. & A. and M. D. & V. R. R. Cos., Baltimore, Md.  
Mr. D. J. CALLAHAN, Washington & Norfolk Steamboat Co., Washington, D. C.  
Capt. A. N. McGRAY, Neptune Association, New York, N. Y.  
Mr. F. L. DU BOSQUE, Assistant Engineer, Pennsylvania Railroad Co., New York, N. Y.  
Mr. CHARLES P. BENNS, Consulting Engineer, Washington, D. C.  
Mr. STEVENSON TAYLOR, President, American Bureau of Shipping, New York, N. Y.  
Mr. WILLIAM A. DOBSON, Naval Architect, The William Cramp & Son Ship & Engine Building Co., Philadelphia, Pa.  
Mr. FRANK E. KIRBY, Naval Architect, Detroit, Mich.  
Mr. HENRY LEYHE, Eagle Packet Co., St. Louis, Mo.  
Mr. T. F. NEWMAN, C. & B. Transit Co., Cleveland, Ohio.  
Mr. WARREN T. BERRY, Superintendent of Marine Construction, New England Steamship Co., Newport, R. I.  
Mr. E. E. OLCOTT, Vice President and General Manager, Hudson River Day Line, New York, N. Y.  
Mr. HENRY A. MAGOUN, Vice President, New York Shipbuilding Co., Camden, N. J.  
Mr. WILLIAM T. DONNELLY, New York, N. Y.  
Mr. GEORGE A. WHITE, Assistant General Manager, Hudson River Day Line, New York, N. Y.  
Mr. E. C. BENNETT, Naval Architect, Fore River Shipbuilding Corporation, Quincy, Mass.  
Mr. EDWARD F. CROKER, Ex Chief, New York Fire Department, New York, N. Y.  
Mr. WILLIAM GATEWOOD, Naval Architect, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.  
Mr. C. H. PHINNEY, Secretary Inspection Department, Factory Mutual Fire Insurance Cos., Boston, Mass.  
Mr. T. H. S. CONE, Aero Fire Alarm Co., New York, N. Y.  
Mr. FREDERIC C. MOTT, New York, N. Y.  
Mr. JAMES FRENCH, Chief Surveyor, Lloyd's Register of Shipping, New York, N. Y.  
Mr. ROBERT V. LA DOW, Dahlstrom Metallic Door Co. (Jamestown, N. Y.), Washington, D. C.  
Capt. W. A. BLAIR, General Manager, Northern Steamboat Co., Davenport, Iowa.  
Mr. ELLIOT H. GOODWIN, Secretary, Chamber of Commerce of the United States, Washington, D. C.  
Mr. P. G. BULLOCK, Art Metal Construction Co., Washington, D. C.  
Mr. PAUL G. BROCK, Art Metal Construction Co., Washington, D. C.  
Capt. G. W. HARNEY, Supervising Inspector, Third District, United States Steamboat-Inspection Service, Norfolk, Va.  
Mr. E. H. DUFF, American Steamship Association, Washington, D. C.  
Mr. J. DONALD PRYOR, General Fire Extinguisher Co., Providence, R. I.  
Gen. GEORGE UHLER, Supervising Inspector General, Steamboat-Inspection Service, Department of Commerce.

## ADVISORY CONFERENCE ON THE SUBJECT OF MAKING PASSENGER VESSELS MORE SECURE FROM DESTRUCTION BY FIRE.

HELD IN THE OFFICE OF THE SECRETARY OF COMMERCE, WASHINGTON, WEDNESDAY, MAY 3, 1916.

### MORNING SESSION (10 O'CLOCK).

The SECRETARY. Gentlemen, it is hardly necessary to ask an assembly of this kind to come to order. I am sorry we have not a beautiful reception hall or an auditorium in which to receive you. If we were to go out to the Bureau of Standards, we could do it in some fit style, but here I can only say that the work of the Department has grown so rapidly that my good associate, Mr. Sweet, has been obliged to give up his office to clerks and we have no room other than this available in this building where we can meet. I hope another year we may be placed so that we can receive you more comfortably.

This is a conference called without any plan at all. We have no program. Our purpose is merely to lay before you the reasons which lead us to ask you to be here and then to ask you to help the Department out of your experience and training to do whatever circumstances may suggest to you.

We keep a record of every accident that occurs to vessels. They come over my desk and they are each of them separately examined into by me, so far as it is possible to do so. One of the things which came to my notice many months ago was the fact that the most frequent cause of disaster to the vessels over which we have to exercise supervision is fire—unaccountable fires, very largely. The experience which we thus have with the merchant vessels is matched in a measure by experience with the hundred and odd vessels which we operate ourselves. We have one fine ship which has been on fire four times. The last time was a week ago last Saturday morning when I was on board of her myself.

I need hardly remind you of what has happened. The disaster to the *Tivoli* in recent months, when she was burned to an empty shell, is still fresh in the minds of most of you. We have here a record of 63 vessels more or less completely destroyed by fire within two years, many of them quite small, most of them when laid up, possibly some of them not wholly disconnected with the question of insurance—we don't know; some of them, unfortunately, vessels carrying a considerable number of passengers, and many of them vessels in commission.

It was not our thought to-day to deal so much with the question of care, of management, for on that we have fairly adequate authority now, and I am glad to say that Congress has just given us 31 additional



inspectors for the purpose of a more thorough watch over that particular phase of the matter. But the question of construction, the question of equipment, is one where we have not, we think, either the detailed knowledge or the authority of law to deal with as adequately, perhaps, as we ought. Nor is it necessarily our purpose as a result of this conference to ask for added lawful authority. We have no plan. What we want to do is to be informed, to learn, to be instructed as to what is wise and what is practicable. There is not one of us, I am sure, who wants to have his wife and child burned to death. There is not one of us who wants to have any other man's wife and child either put to death or put in jeopardy. We want to do what is practicable. I very strongly felt, and Gen. Uhler felt as I did, and a very happy suggestion from Mr. Myrick, of the committee of the Chamber of Commerce of the United States on the Steamboat-Inspection Service, came at the same time to bring the matter to a focus, that we ought at least to have the advice of thoughtful and experienced men on the whole problem presented by the danger to thousands of people, largely women and children, and to the crews of vessels, often confined in spaces from which exit is not always easy and rapid. We ought to have the advice of thoughtful men as to what is practicable, if anything, commercially, economically, soundly, in dealing with this matter.

So there are no preconceived notions nor purposes nor plans. We are here and have asked you to be here that we might learn. I think, inasmuch as the first material contribution to this matter in our thought came from Mr. Myrick, I will ask him if he will step forward and express his views to the conferees.

I want to add a word. Perhaps you may not all know my friend and colleague, Secretary Wilson, Secretary of Labor, who has come here by invitation to hear, as I am present to hear, and learn what may be developed.

**STATEMENT OF N. SUMNER MYRICK, ESQ., SPECIAL COUNSEL OF  
THE CHAMBER OF COMMERCE OF THE UNITED STATES, WASH-  
INGTON, D. C.**

Gentlemen, I take the kindness of the Secretary in calling upon me to speak to you thus early in the session, if indeed I should have been invited at all, as a mark of his confidence, perhaps, in the result of the investigation which it has been my good fortune to make on behalf of the Chamber of Commerce of the United States of the Steamboat-Inspection Service. Perhaps I ought to refer briefly to my qualifications as an investigator before saying anything further. I was born at a seaport. My childhood and early life were spent about ships and steamboats, fishermen, etc., and all my life I have been very intimately connected with the matters in which you are interested. When I began the investigation, which I have just concluded, my thought was very early directed to this question of fire protection on passenger steamboats. I have reached certain conclusions which, by the way, I am not going to express at this time because it is quite unnecessary that I should; but I feel and for a long time have felt that something should be done to rectify mistakes of construction in respect of fire resistance that have characterized the steamboat building of the past.

I also feel that it would be eminently unwise, not to say unfair, to require steamboat men to make radical changes in existing vessels that might and probably would involve large expenditure of money, because the law and public sentiment have encouraged the construction of these vessels of material and in design as they now exist. I do feel, however, that something can be done by intelligent cooperation among steamboat men, designers, and builders to lessen very greatly the fire hazard of steamboats hereafter constructed, and modify to some extent the fire hazard of those now in service. It was this belief or feeling that led to my suggesting to the Secretary, as he has pointed out, the conference which we are holding here to-day.

I have only two or three ideas to express. One is that this conference ought to afford opportunity for individual views upon the subject in a town-meeting way, and that at the conclusion of the conference a committee should be appointed to take this whole matter under consideration, give it thoughtful attention, and report at some time in the future their conclusions. Having so reported, the conclusions should be, so far as practicable, embodied in the law, for various reasons, and among them this: I had the pleasure of visiting in Chicago a comparatively new steel vessel, a splendid type of boat for the service in which she is engaged. I said to the gentleman who showed me over the boat: "You have spent a great deal of money on this ship; turned out a safe and beautiful craft. Is it fair that I should be able to go down the Lake somewhere, pick up a rattletrap, unsafe boat, bring her here and run her in competition with you, or should the law be so framed that everyone would be put upon an equal basis, an equal footing?" That is one reason why I think that whatever conclusions this committee, if it is appointed, arrives at should be put into the form of law, so far as may be practicable.

I make the further suggestion in reference to the composition of the committee, that it be not composed entirely of steamboat men, but that a fair proportion of steamboat men, a certain number of men from the construction department of the Navy, and one or two men outside any branch of the Government be appointed. I should very much hope that Dr. Stratton, of the Bureau of Standards, be one of the committee—not that he would contribute anything so far as the form of construction is concerned, although he might be able to do that—but that he would be able to make valuable suggestions as to the material that could be employed in the construction of future steamboats.

One fact that has been impressed upon my mind during the progress of my investigation is this, that when our modern passenger ships take fire they burn with incredible rapidity, as the records show; so rapidly that, in most cases, it has been impossible to launch all the boats. While it is not practicable, I believe, to build an entirely fireproof vessel—that is to say, out of any material with which any of us are familiar at this time—I do believe it is practicable so to build these boats that the progress of a fire would be so retarded that the passengers would have a chance for their lives. If it were worth while, I could give you a good many illustrations of the burning of vessels that would emphasize the point that I am now making.

I think, Mr. Secretary and gentlemen, that this is substantially all that I have to say at this time. I very much hope that something will come of this conference, and I believe that if you gentlemen approach the subject with a determination to do something, rather than with the feeling that it is desirable from your point of view to get by as easily as possible, something substantial and well worth while will be accomplished.

The SECRETARY. Thank you, Mr. Myrick.

In pursuing the discussion may I ask that each gentleman who may have anything to say will kindly give his name to the stenographer as he speaks in order that the record may be clear. If those who have not already given their names to the stenographer or their business cards will kindly do so before we adjourn, it will serve to make the record more complete.

I want to add merely to what Mr. Myrick has said a suggestion as to a principle which seems to me to have soundness. The late Edwin Atkinson, of Boston, had to deal, as I am sure you know, with the most serious fire problem in the country, the problem presented by the cotton mill. He dealt with it by a philosophy which by some at the time was thought very unreasonable. He laid down three rules for fire protection as the president of a fire insurance company. The first rule was that no fire had any business to happen. The second rule was that if a fire did happen, it had no business to extend very far. And the third rule was that if it did extend very far, it ought to be put out. In his point of view, fire extinguishing was the last and not the first thing to be looked at. The absolute prevention of fires was the first thing, and the restriction of them by proper construction was the second.

I think it is a matter of history familiar to you all with what extraordinary success that policy has worked out, so that the most inflammable of all industrial plants is that which has the smallest record of fire.

I think there is wisdom in the principle. Now the field is open. We think something should be done. What, we do not yet know, and we welcome suggestions from any of you on the subject as you see it.

Mr. Taylor, as president of the American Bureau of Shipping, perhaps you might speak to us.

**STATEMENT OF MR. STEVENSON TAYLOR, PRESIDENT, AMERICAN BUREAU OF SHIPPING, NEW YORK CITY.**

Mr. Secretary, I do not know that I have anything to say on this subject more than that in my experience we have endeavored to add the very things that you and Mr. Myrick have outlined, and judging from results we have done so with considerable success.

It goes without saying that a fire should not occur at all, and the other corollaries of Mr. Atkinson's law follow as a matter of course. On the other hand, there is the practical side of this question that must be considered. It is possible to build an unsinkable boat; it is quite possible to build a boat that can not be destroyed by fire; but in going to these extremes it is also possible to build boats that will not be of any service to anyone.

I read between the lines that it is your endeavor, Mr. Secretary, and I know it is the endeavor of Mr. Myrick, that something should be done toward making vessels safer, particularly from danger by fire; something that is *reasonable*, to use the word made so expressive

by the United States Supreme Court. I can assure you so far as my rather full acquaintance with shipbuilders and shipowners goes, that all of them will be very glad to do whatever can be done to make lives as well as property safer on board of their vessels.

The difficulty will be to make general rules that will cover all cases, for the variety in the types of boats used in the business of this country is exceedingly great. Take the western-river boats, for example. They must naturally be built particularly light and of peculiar construction throughout on account of the lack of water at times to float these boats; and I may say there is no better exhibition of engineering skill than is shown in meeting the requirements of the western-river boats. Now, seagoing, Sound, Lake, and eastern-river boats all differ materially from the western-river boats and as materially from each other, each type having a style and character of its own. No general rules can be formulated to govern them all.

There are many things that can be done to make boats safer against fire. Some of us have tried very faithfully to do these things. Some of the gentlemen in this room I know have given many hours of serious thought, and others of them have spent a great deal of money to produce the desired result, and they feel as I do that the results show the advantage of their investigations and their efforts to carry out the desires expressed by you.

The suggestion of Mr. Myrick that a committee should be appointed is a particularly good one, for this assembly is like a town meeting, and if every man here had his say in full upon this subject, we would probably get nowhere; there would be such a diversity of ideas and opinions as to what would be the best thing to do.

We are naturally inclined to look at any question from our own personal standpoint. I know what is good for the Long Island Sound boats, but I am not quite sure that I know what is good for a western-river boat. I could prescribe something for the steamers with which I am familiar, but could not prescribe so well for others.

I may refer in a general way to the burning and reconstruction of the steamer *Plymouth* of the well-known Fall River Line. This line has had but two boats burned in its career of 69 years. Both of these, the *Bristol* and the *Plymouth*, were burned while laid up at the wharf in Newport with no passengers and but few others on board. The *Plymouth* had but two watchmen, each of whom had passed the place on fire at least once and had not noticed or reported it. Evidently they were only intent on punching the watchman's clock, which proved what I have said as to their passing the place without noticing the fire.

When we started to rebuild the *Plymouth* the question of making her fireproof was uppermost and we went into the matter very carefully. We found that the joiner work built as usual weighed 440 tons and the same built of steel would weigh 830 tons. As this additional weight would cause an increase of about 14 inches in the draft of water, setting aside other serious considerations, it is evident that such a reconstruction was absolutely impracticable. For example, seven-eighths-inch white pine is used for joiner decks and a steel deck of equal weight would be but one-sixteenth inch thick.

The problems and difficulties encountered in building a passenger boat like those of the Fall River Line are quite different from those of a simple ferryboat. It has taken many years to reach the present

state of development, for which the minds of many men are responsible. The results of construction and care in operation have been most remarkable. It is quite proper for me to say here that during the 69 years continuous running of the Fall River Line but one passenger has lost his life, and that by being struck in a collision in a thick fog.

I can also truly say, after 35 years of experience with the Sound lines, that the management has always desired the best in everything, the matter of cost being secondary.

When the reconstruction of the *Plymouth* was commenced, we tried to make her safer and better than before. One of the improvements that occurred to me was the placing of two cross-fire bulkheads, with doors across the passages in the saloon at the ends of the engine and boiler inclosures—doors like those used in cotton mills, that could be closed in case of fire. These doors are not absolutely fireproof, but sufficiently so to act as a fire deterrent, and dividing as they would the length of the boat in three parts, there would not be quite the same likelihood of the flames sweeping at once the entire length of the boat.

The question of freight must also be taken into consideration, for freight must be carried. If a conflagration took place amidst the freight, even an entire steel structure would not stand, and the result, as shown in many instances of fire in steel store or warehouses, would be destruction.

So the next improvement was to cover the interior of the freight space with sheet steel fastened closely to stanchions, facing, carlins, and underside of deck over the freight without air space.

Then, growing out of my own experience in shops, I put fire sprinklers all over the boat, following the first system of sprinklers placed by me on the freighter *Pequonnock*.

When we built the *Massachusetts*, *Bunker Hill*, and *Old Colony* in 1906, and the *Commonwealth* in 1908, we used the same precautions that were used on the *Plymouth*.

We also used the same system of fire-pump discharges that we had used on the *Puritan* in 1889, that of having three or four discharges separated at the pump, carrying the lines forward, amidship, and aft so that a fire occurring near one of the lines and possibly destroying a line would not entirely incapacitate the pump, for the pressure could still be kept up on all of the other lines.

For the *Commonwealth* we also considered wood that had been chemically made fireproof, but found this wood was not satisfactory. Since that time there have been other materials devised in the way of compo and asbestos board such as has been used to reduce the fire risk on the steamer *Washington Irving* by my friend, Mr. Olcott, who is present.

I need not call attention to the need of constant and thorough inspections and drills in the use of all apparatus on vessels, but after all, Mr. Secretary and gentlemen, you may take all the care you will, there still remains to be taken into consideration the human factor. No line of steamers can run forever without an accident unless the human factor is so alert, so well disciplined, and so faithful that nothing can happen without immediate discovery, with immediate action for the best. Disasters will, in spite of us all, happen on the

water as they happen on land, though it is our duty to minimize them if possible.

The SECRETARY. Mr. Olcott, you can speak to us, I am sure, as manager of a very important passenger line. We shall be very glad to hear what you have to say.

**STATEMENT OF MR. E. E. OLCOTT, REPRESENTING THE HUDSON RIVER DAY LINE, NEW YORK CITY.**

Mr. Secretary, there is nobody, as Mr. Taylor has said, that is more interested in this subject than we are ourselves. The wonderful record of the Fall River Line, dating back before his time, in transporting so many people without the loss of a life, speaks for itself without any argument.

We have all been pleased, Mr. Secretary, with your gracious reception of us here and with your request that we make suggestions. I am like Mr. Taylor in feeling that I have not a great many to make, anxious as we are to give the result of all our experience. I do not know that everybody in the room knows that you, Mr. Secretary, were once a steamboat man and this connection with the business in early life helps you to understand our position now.

As for the suggestion of Mr. Myrick, I think that is excellent. One thing I was pleased to have him mention was the danger of competition from what he, not I, called "rattletraps," because that is something which ought to be safeguarded by this great Department. We do not run under any franchise. We can not buy a right of way on the navigable waters. We are therefore in a very different position from that of a railroad. It has its right of way, which it has acquired, and under the present laws a road can not be paralleled very easily by another line. These difficulties, under which the boat lines labor, should be realized by the public.

Mr. Taylor has also spoken of the compressed asbestos and pulp boards which we used in the construction of the *Washington Irving*.

The SECRETARY. Will you tell us about them?

Mr. OLCOTT. Asbestos is wholly noninflammable but it is very heavy in weight and brittle so that in the public gangways it is not as practicable as compressed paper pulp board, which is very much less inflammable than wood. The three-sixteenths-inch asbestos boards were largely used in the partitions in the crews' quarters. This board being absolutely fireproof is a wonderful safeguard.

In our special case we consider our safety comes from the fact that our boats run in the daytime when everybody is awake, and even the least smell of smoke would be detected at once. We have never had a fire that amounted to anything during the running seasons of our boats. The great thing in the construction of the *Hendrick Hudson*, the *Washington Irving*, and the *Robert Fulton* was a steel casing from the hold to the hurricane deck. The galley and the boiler compartments are the more dangerous places on shipboard, so we put in a steel casing from the hold to the hurricane deck so that if any fire should originate it could not communicate with any of the woodwork.

We had the great pleasure and honor of a surprise visit from Supervising Inspector General Uhler some time ago, and he did not come alone. He brought with him supervising inspectors from practically

the whole country, who had been attending a session in New York, and they went over the *Washington Irving* from hold to pilot house. We were very glad to see them and would have welcomed any suggestions they had to offer. They expressed satisfaction with all they saw.

I want to give credit to Mr. Frank E. Kirby, our consulting engineer, and who is here to-day, for the many safeguards introduced in the construction of the *Washington Irving*, *Hendrick Hudson*, and *Robert Fulton*. The last time the steamboat-inspection laws were extensively modified, he, at the request of President Roosevelt, recommended most of the changes that were adopted.

I agree with Mr. Taylor, again, in saying that a town meeting is not a place at which to arrive at practical solutions of any problems. A committee of individuals will have to sit and go over the matter in hand and then suggest revisions.

I repeat that we want to do everything that is practicable and reasonable.

Our boats have to be of extremely shallow draft, and it is a good deal of trouble to build a boat of large capacity and not have it draw more than 8 or 8½ feet of water; and so you can not lay down any universal law, but we have looked into every device and we have tried to be as careful as possible. We put in our boats the Aero fire alarm. The essential feature of this system is a very fine tube of copper filled with air. A very little increase of temperature will expand the air in this small tube and send in the alarm. We have never had a fire so as to test it in that way, but we are experimenting all the time. Even holding a burning match alongside a little piece of the tube will set off the alarm.

One source of danger which I think is worth mentioning in this connection is the miserable, deplorable cigarette. If people would stop smoking the cigarette, our risk would be reduced. A cigarette smoker is careless. It is astonishing how long a cigarette butt will smolder, and if it falls into inflammable matter it is easy to make a fire.

The SECRETARY. Mr. Olcott, was the use of fiber and asbestos on your steamers made with the definite idea of fire restriction?

Mr. OLCOTT. Oh, yes. We experimented with lots of things.

The SECRETARY. Have you attempted to do anything in the way of doors such as Mr. Taylor has described?

Mr. OLCOTT. No. I have looked into that matter. One objection to them is that they are heavy. Our instructions are to stop the boat if a fire starts. Of course, we are scarcely ever more than a half mile from shore, and we have long gangplanks which in most cases in the Hudson River would be long enough to land the passengers on the bank or in water of wading depth, on account of the shallow draft of our boats.

The SECRETARY. If you were building a new boat to-day, with all you know, what would you do that you have not done? Pardon my asking the question.

Mr. OLCOTT. Of course, I am glad to answer any question you desire to ask. I can not think of any differences or changes I would make. We are rather afraid that bulkhead doors would be a source of danger rather than protection, where we carry so many people, in preventing them from leaving the boat in case of an emergency. In freight spaces they might be put in to advantage, but I do not think,

in the case of our day boats, that they are necessary. We carry no freight and have no inflammable cargo, so I do not think bulkhead doors would be of much avail. We considered them in building our last boat, the *Washington Irving*, which came out in 1913, but decided against them.

We have no cargo space at all, and have great facilities by broad stairways and broad gangplanks for unloading our passengers. We ordinarily, at our two principal New York landings, Forty-second Street and One hundred and twenty-ninth Street, unload 250 people a minute. If there was any haste, we could unload many more than that. Three gangplanks, each 6 feet wide, are used at a time. We tie up as near as we can at all our piers and adjust the gangway drop so we accommodate ourselves to the conditions of the tide; so the gangplank is nearly level, and that is a big help. We make quick landings, as we have seven intermediate landings between New York and Albany, and in many places we take on hundreds of passengers, to say nothing of their trunks.

The SECRETARY. Mr. Kirby, we would be very glad to have a word or two from you, and I want to ask you a question or two at your convenience.

**STATEMENT OF MR. FRANK E. KIRBY, NAVAL ARCHITECT,  
DETROIT, MICH.**

Mr. Secretary, at first thought one feels that an all-metal or steel structure would be an ideal fireproof building, and yet it is the universal practice that in all fireproof buildings on land no metal or steel work shall be exposed where fire could reach it. It is, therefore, protected or fireproofed, as it is called, by tile or concrete covering. An example of such a structure was the Iroquois Theater, located in the city of Chicago, which burned in broad daylight during a matinee performance, resulting in a greater loss of life in proportion to those present than on the steamboat *General Slocum*.

I was in the city of Augusta, Ga., a few days after the great fire which destroyed over a hundred acres of buildings. I examined the skyscrapers built on the latest up-to-date plan of fireproof construction. The largest one was a new building just about completed but unoccupied. There was some scaffolding in the building when the fire occurred. The blackened and scorched walls, the spalled trim around the doors and windows showed plainly that human life could not have survived in the building. This leads one to wonder how much protection these structures afford and what is the real hazard from fire.

Because there are more structures on land than on water, and therefore more danger from fire, more thought by more people has been given to the matter of fireproof construction and fireproofing.

I have not much solicitation about the fire hazard on a modern excursion steamer—a boat without sleeping accommodations for passengers, and not carrying cargo—having a steel hull with steel inclosures around stacks, engine and galley casing, and vents. The inclosures should be open at the top. I mention this point because I learned of a case only a day or two ago where, owing to closed top, the firemen were driven out of the fireroom, resulting in failure of steam pressure and destruction of the ship.

The SECRETARY. Are you speaking of any specific boat?



Mr. KIRBY. Excursion boats at Detroit, Buffalo, and on the Hudson River.

The SECRETARY. The *Seeandbee*?

Mr. KIRBY. That is a different type of boat. I will touch on that in a moment.

I confess I have most faith in proper personal management of ships for fire protection. When it comes to a boat carrying merchandise cargo on the main deck immediately under the cabins, particularly night boats, that is a matter for more serious consideration. There are a great number of ships of that type. I have two in mind where the owners were particularly solicitous that they be made as fireproof as possible. The plan followed was to make the hull and all work below main deck of steel, even the bunks for the crew and bulkheads dividing the crew's quarters; in fact, everything below deck. All inclosures on main deck, stack and engine casing, galley and all vents, of steel extending well above the upper deck. Store and linen rooms on all decks, of steel or fireproofed wood. Skylight sash of steel, with wired glass. When it came to the consideration of the promenade deck, which is immediately over the cargo, it was first designed to be of steel, but on account of the difficulty of fireproofing, that plan was abandoned and finally made of wood and fireproofed on the underside with asbestos boards and sheathed with galvanized iron, care being taken to have no fastenings through the deck. A model section of this deck construction was first made and arranged to form the top of a furnace, having side walls of brick. This was fired with pine wood. After burning an hour, though quite hot on top, it was an efficient protection against the fire.

The SECRETARY. How thick was that?

Mr. KIRBY. An inch thick. The carlings were 3 inches by 5. We were careful to have no fastening through the deck, but instead all fastenings were horizontal through the carlings. This prevented pulling under the effect of the heat.

The SECRETARY. Is not that a lighter modification of modern mill construction?

Mr. KIRBY. I do not know much about mills.

The SECRETARY. Capt. Phinney.

Capt. PHINNEY. Where the mill construction is the main feature they use larger members, 12 by 16 for beams and 3 by 4 inch plank. The theory is that while you can kindle a fire in your fireplace very easily with small pieces, you find it very difficult to kindle it with logs of wood.

Mr. KIRBY. We have to rely upon a different principle. We must keep the fire away from the thin wood. The promenade decks of the steamers just described are supported by pillars of solid round bars, which withstand fire better than tubes. The whole of this cargo space is provided with sprinklers and is also divided at the engine room about amidship with steel rolling shutters and the saloon decks are also divided into sections by fireproof doors to segregate a fire if forward or aft. The sprinkler system is also extended in other parts of the ship, both above and below the main deck. In addition, the ships are fitted throughout with the Aero Fire Alarm system with indicators in the engine room and pilot house.

The SECRETARY. Have there been any fires on board those vessels?

Mr. KIRBY. Not on those particular vessels, but it is quite usual to have fires on steamers during construction, there being all sorts of tinkers aboard—plumbers, iron workers, joiners, and people who are likely to make fire. I only mention this as my own experience.

The SECRETARY. What would you do in the light of your present knowledge, Mr. Kirby, that you have never done in the way of fire restricting or in the way of fireproof construction?

Mr. KIRBY. In regard to that matter, I have not considered the subject lately because, notwithstanding the greatest boom in ship-building ever known on the Great Lakes, there is not a single passenger steamer building and there has not even been a single inquiry for one. That being the situation now, I have not to bother about fireproofing or anything else.

The SECRETARY. Mr. Kirby, have you made any inquiry or had anything to do with the process of fireproofing wood as carried on by the Forest Products Laboratory of the Department of Agriculture at Madison, Wis?

Mr. KIRBY. I can not say I have; but I have had samples, of course, of fireproof wood sent to me by manufacturers at different times. I have tested it in an open fire and under similar conditions.

The SECRETARY. Of course the Forest Products Laboratory is not interested in any particular manufacturer. They have achieved some rather wonderful results with fireproof wood. For instance, I have seen wooden furniture which has stood fire at 1,000 degrees without material injury. They have studied the matter through a long period, with some very interesting results. I wondered if the matter had been brought to your attention at all.

Mr. KIRBY. No, sir; it had not.

The SECRETARY. I am rather hopeful of something of that kind.

Mr. KIRBY. I had hoped that some process would be found to be practicable.

The SECRETARY. I think it would be of interest to you to inquire of Mr. Weiss, the director of that laboratory——

Mr. KIRBY. I certainly will do it.

The SECRETARY (continuing). To see what they have actually done. They have built a cabin of considerable size, fully furnished with desk and office furniture complete, and then they burned it up. Then they built the cabin over again with fireproof wood and they could not burn it up. Then they built it over again with fireproof wood and put in some furniture that was not fireproof, which furniture burned. They have a splendid moving picture of those experiments.

Mr. OLCOTT. May I ask, Mr. Kirby, about these bulkhead doors he spoke of, whether he thinks the point that Mr. Taylor made that they might prevent passengers from leaving, might not show that they are not necessary on a passenger boat?

Mr. KIRBY. I have given some consideration to that, as Mr. Olcott said. I am the responsible designer for his steamboats. I had considered that matter. I felt that the free movement of passengers was more important. Of course you understand those are day boats and there are people all over them. I am not solicitous about danger of fire on that type of steamboats compared to those boats that carry cargo.

The SECRETARY. I am interested, gentlemen, in what Mr. Olcott said about the effects of this fiber board in resisting fire. I remember

very well when a large paper mill near my home burned, burned completely. There were stacks of the paper in the mill in various places. What they did with those stacks after the mill was destroyed was to trim off 2 or 3 inches of the edge and sell them as perfectly good paper. It was almost entirely undamaged except for an inch or two at the edge.

I want to just mention two causes of fires that we have had in our Department here within a month, and then I will ask Mr. Gatewood to speak to us, for I believe he had the designing of a vessel with steel upper construction. We have had three fires on one vessel arising from short-circuiting electric wires built 12 years ago, in wooden tubes, wooden coverings. Naturally we took that all out and put in steel tubing. Another cause of fire was one in which the bunkers lay immediately adjoining the fireroom, which was rather warm. A certain grade of soft coal in those bunkers (although there was a steel partition between the two) ignited at the base of the bunker from the heat transmitted through the steel plating, and we found it necessary to put in an air space there to prevent the transmission of heat through that plate. That was sufficient to set the coal on fire and obliged us to throw out all the coal from the bunkers.

Mr. Kirby, did you wish to say something?

Mr. KIRBY. The most serious fire we ever had on a new vessel was the *City of Cleveland, Third*. She was partly constructed. I do not mean to say that she was a steamboat. She was building. The sash were not in the windows. She had several piles of this fiber board on her decks, and after the fire had burned down (that stuff had dropped through to the main deck) we trimmed off the edges and used the rest of it. On many steamboats all of the panel work around the saloon is made of that material, the panels of the doors as well as of the staterooms.

The SECRETARY. Mr. Gatewood, you are connected with the Newport News Shipbuilding & Dry Dock Co.?

Mr. GATEWOOD. Yes, sir.

The SECRETARY. Will you tell what your experience has been in this connection?

**STATEMENT OF MR. WILLIAM GATEWOOD, NAVAL ARCHITECT, NEWPORT NEWS SHIPBUILDING & DRY DOCK CO., NEWPORT NEWS, VA.**

Mr. Secretary, it has been some 11 years ago now since we started the construction of the *Jamestown*, a vessel intended to ply on the Potomac River. At that time we felt that about the only material which was fireproof was steel, and we used as much steel in the construction of the vessel as we found we were able to use. The vessel weighed about 10 per cent more on account of the steel we did use. We were not very limited in draft and the vessel was able to stand that additional weight. The boat was comparatively small, and 10 per cent on a small boat is not as great as on a large boat. We did not succeed in getting a boat which was what could properly be described as fireproof. We experimented with various materials, especially with steel, and were unable to provide any material which would serve the purpose of passenger decks, so that we were forced to use wood decks. We cased them on the underside with sheet steel, but we were unable to protect the upper surface properly. We tried rubber tiling on the

weather deck. We found it would not stand the variations of temperature and extremes of weather, so that the tiling had to be removed from the weather deck. So while the boat was perhaps somewhat safer from fire than vessels previously built, it could hardly be ranked as a strictly fireproof vessel.

The SECRETARY. Would you repeat the construction you then used in any other vessel if you were given liberty in the matter?

Mr. GATEWOOD. Well, we shipbuilders usually try to meet the requirements of our clients. If a shipowner should come to us and ask us to build him a vessel of a certain type, we would endeavor to do it. While we have some ideas of our own, yet we feel that our main vocation is to build ships for owners, and that it is the owners' privilege to specify the kind of ship that they want, understanding that they perhaps know the details of their business and their requirements better than we do.

The SECRETARY. But if a shipowner asked your advice, what would you give him in the way of advice as a result of your experience with the *Jamestown*?

Mr. GATEWOOD. If he was willing to put up the additional money, we would tell him that we could give him the measure of safety which we had been able to accomplish on the *Jamestown*.

The SECRETARY. Could you better it from your present knowledge?

Mr. GATEWOOD. Since the days of the *Jamestown* we have not built any excursion steamers and only a few river steamers of any kind—only one, I think—so that our experience has gone rather along the line of other craft since those days. To my present knowledge we have no material which is strictly fireproof and which is adaptable to the upper works of our light river steamers. If anything has been brought out which is entirely suitable for the purpose, we are not acquainted with it. We have used materials on vessels which have been of the nature of fireproof material.

The SECRETARY. Such as—

Mr. GATEWOOD. Well, we have used asbestos board and fiber boards of one kind or another, but it is difficult to make them serve the purpose of more than removing a certain amount of more inflammable material rather than to make them real fireproof screens.

The SECRETARY. Is it your opinion, if I understand you correctly, Mr. Gatewood, that something is possible in the way of fire restriction rather than in the way of fireproofing in the strict sense?

Mr. GATEWOOD. Mr. Secretary, it is of course well known that if you can limit the amount of wood and replace it by something which will not itself add to the flame, you are accomplishing something along that line.

The SECRETARY. You have heard the suggestions that have been made as to the practice with regard to bulkheads and to what we may call fire screens. What is your view on that?

Mr. GATEWOOD. I rather think that for seagoing vessels where the vessels are out of reach of land some means of preventing a fire from spreading would be an eminently useful thing.

The SECRETARY. But for river vessels?

Mr. GATEWOOD. For river vessels I rather think with Mr. Taylor that it would prevent the proper taking care of a large number of passengers by separating them and preventing access to parts of the

vessel; and the disadvantage would more than offset the advantage that would be gained by the use of the screens. I do not know that that would apply as strongly to the night vessels. I understand that the experience of the Fall River Line has not shown any disadvantage in the use of the fire screens, which they have installed on their later vessels; but in that, of course, I am only speaking from hearsay.

The SECRETARY. Is it your experience, Mr. Gatewood, that owners call upon you for a less safe vessel than you would yourself build for the purpose intended if you were given permission so to do?

Mr. GATEWOOD. No; I would not like to make that statement.

The SECRETARY. I do not mean it as a general statement but is it so sometimes?

Mr. GATEWOOD. Well, of course, Mr. Secretary, you know that there are all sorts of people in the world and that we each one of us try to live up to our lights. Some owners know their particular business, know they have not had trouble with certain vessels, and they therefore can not see the use of spending more money and of making departures from their present practice.

The SECRETARY. Would you mean by that, that having had no fire they did not see the necessity of preventing one?

Mr. GATEWOOD. Well, very much along that line, yes. If there were no fires, people would not bother about fireproof construction. It is because fires do occur that people look out for them, within the limitations of their business.

The SECRETARY. Can you offer any suggestion, Mr. Gatewood, referring to excursion and passenger steamers, whether day or night, and to steamers on bays and lakes and rivers, which would in your judgment generally better safeguard them against fire by construction?

Mr. GATEWOOD. If you have exposed woodwork in a vessel and are able to case it with something which would prevent flames from reaching it, you will probably have offered a safeguard against fire.

The SECRETARY. To what particular portion of the vessel's construction do you now refer?

Mr. GATEWOOD. To any part at all. For instance, on combined passenger and freight vessels it would appear that there may be danger from fire from the freight. In such case the freight could be separated from the rest of the vessel, if it is feasible to do so, by something which will not readily transmit the flame. Of course, on those steamers which load one day and unload the next, danger from fire from freight is very much reduced, in my opinion, from those which keep the freight on board for long periods of time, just as you mentioned about the coal in the bunkers. If the coal in the bunkers is continually renewed, I think the danger from it is very much reduced. So that you can have conditions fairly safe for vessels which load one day and unload the next which do not apply to sea-going craft where the cargo is confined for days.

Let me add that while accidents by fire are more frequent on vessels at dock than while under way, it would seem that further precautions could be taken to prevent the starting and spread of fires than are taken on the average vessel. Completely inclosing the freight spaces by steel, including steel covers for hatches and ventilators, would seem proper on vessels carrying any considerable number of passengers. The elimination of a large quantity of wood and other

combustible material from passenger quarters can be made in many vessels at small first cost, and in some vessels at a saving in cost. The traveling public which approves of steel railroad coaches will probably offer no objection to greater simplicity on vessels if it is accompanied by an assurance of increased safety.

The SECRETARY. Have you had any experience with sprinkler systems on vessels?

Mr. GATEWOOD. No, sir; we have had almost none.

The SECRETARY. You have not installed any?

Mr. GATEWOOD. No, sir; so far as I know, we have not.

The SECRETARY. Is there anybody present who wishes to ask Mr. Gatewood any questions?

Mr. BENNETT. Mr. Gatewood, do you think it would be practical to fit a water screen instead of a steel divisional bulkhead?

Mr. GATEWOOD. I have never had anything to do with a water screen.

Mr. BENNETT. I am somewhat in sympathy with Mr. Stevenson Taylor's remarks. The divisional bulkhead would not, however, be an element of safety in all cases. It would be an advantage on ocean-going passenger vessels where the design is so different from that of Sound and river steamers, but in the latter I believe the divisional bulkheads would seriously incommode the movement and handling of passengers. In place of these steel divisional bulkheads I inquire whether a water screen or curtain would not be a good proposition; that is, it would isolate certain portions of the boat in case of fire and yet allow passengers and crew to go backward and forward.

Mr. GATEWOOD. Do you speak of a perforated pipe in case of fire?

Mr. BENNETT. Yes.

Mr. GATEWOOD. I think there is such a system in use on the exterior of buildings for protecting them.

Capt. PHINNEY. It is very common now to have that safeguard against fire and up to a certain limit it works well, but with a very hot fire it is not a complete success.

Mr. BENNETT. Do you think it keeps sparks from flying?

Capt. PHINNEY. No doubt it would prevent sparks from going through. The great difficulty we have is to make it perfect. Some of the openings will get clogged up and you will get a hole through your screen at the worst place in the fire. They are a help, but we do not think a prevention.

Mr. BENNETT. Mention has been made of the use of fiber board. At the Fore River Shipbuilding Corporation we used a lot of this class of material in connection with the Argentine battleships we built. The specifications for those vessels required that all staterooms be paneled, while the extent of the furnishings were luxurious when compared with those installed in war vessels of other navies, and the material composing the paneled bulkheads was required to be at least fire resisting. We made a number of experiments with various patented "boards" and found the most satisfactory, from a fire-retarding view, was one made almost entirely of asbestos. The stateroom bulkheads proper were constructed of steel with metal furring each side to which were fastened the asbestos boards by metal strips along seams, giving the bulkhead a large paneled appearance. Due to the furring pieces

between bulkhead and asbestos board there was an air space. We believe this construction of bulkheads made a very effective fire retarder, but of course it was expensive.

The SECRETARY. How was it as to weight?

Mr. BENNETT. It was somewhat heavy. If I remember rightly, about 3 pounds per square foot.

The SECRETARY. What thickness did you use?

Mr. BENNETT. Three-eighths of an inch for the asbestos board?

The SECRETARY. How frequently was it supported?

Mr. BENNETT. About every 30 inches. We had to support it so that if a man fell against it, it would not break.

The SECRETARY. What was the width of the air space?

Mr. BENNETT. It varied with structural conditions, but generally it was about a quarter of an inch, or, in other words, the thickness of the metal furring.

The SECRETARY. Would this "board" take a finish?

Mr. BENNETT. Yes; it took paint very readily.

The SECRETARY. It was an interior wall?

Mr. BENNETT. It was the interior wall of each of the officers' staterooms. Even though they removed the major portion of the wood furniture, before going into action, yet there was a certain amount which had to remain for everyday accommodation and which would be liable to catch fire or smolder and generate smoke. The Argentine Government desired to guard against that, and we made each cabin a more or less isolated compartment, so that no fire could spread.

The SECRETARY. Mr. Bennett, suppose you had a free hand, and that I came to you and said, "We want the very last word in the way of precautions against fire"—we will not use the word "fire-proof" because we will all agree that metal will burn. What would you recommend?

Mr. BENNETT. On passenger vessels of the "Sound" and "river" design, I should be inclined to suggest a water system—a sprinkling system.

The SECRETARY. You mean a sprinkler system with water heads at various places?

Mr. BENNETT. Yes; in passages and also in main living rooms; that is, the rooms where a number of people congregate. There is always a lot of furniture there that is combustible. Of course the arrangement and number of sprinkler heads would depend entirely on the design of the vessel.

The SECRETARY. Now, to go into details: Would you use a wet-pipe system?

Mr. BENNETT. Either wet or dry, preferably "wet" and automatic, arranged to be under pressure from a tank on the topmost deck.

The SECRETARY. Would you be limited by the weight and height of the tank?

Mr. BENNETT. Not by the size of the tank or tanks I have in mind.

The SECRETARY. How much water would you have to carry in your tank?

Mr. BENNETT. Sufficient only for the automatic sprinkler heads to keep going until the steam fire pump could be put into operation. In other words, the tank would act as a reserve or ready supply.

The SECRETARY. How long?

Mr. BENNETT. Perhaps 5 or 10 minutes.

The SECRETARY. How much water would you have to carry?

Mr. BENNETT. That I can not say offhand, but the little revolving sprinklers I have in mind would not use up a great amount of water before the fire pump was started.

The SECRETARY. Have you ever given thought to the question of the weight and location of this tank?

Mr. BENNETT. Not seriously. At present, in many instances, we arrange gravity tanks on the topmost deck for fresh water and sanitary purposes and these tanks run up to 500 or 600 gallons capacity, and I see no reason why the present sanitary tanks could not be piped up to the automatic sprinkler system.

The SECRETARY. Has your attention been called to any method of utilizing in a sprinkler system the same mixture that is used in chemical fire engines and thereby greatly reducing at once the size of the apparatus and its cost?

Mr. BENNETT. Not especially.

The SECRETARY. Has that system come to your knowledge?

Mr. BENNETT. No, sir; it has not. In fact, I am like Mr. Gatewood in regard to this. We have not yet found in building boats at Fore River a shipowner who paid extraordinary attention to fire prevention, other than that required by the United States supervising inspectors and classification societies.

The SECRETARY. Is not that, after all, the central fact in your experience in building passenger steamers, that the shipowner does not put special stress upon fire prevention?

Mr. BENNETT. Generally, in the ships we have built he does not. But, I should like to qualify that by stating that we have not built what we call a "full" liner or a "full" passenger boat for a number of years.

The SECRETARY. Referring to what Mr. Gatewood said about sheathing the underdeck spaces against fire: What have you done in that direction?

Mr. BENNETT. Nothing.

The SECRETARY. What do you think of that?

Mr. BENNETT. If you can incase or inclose a compartment or hold built of wood by a sheet-metal sheathing and allow a small air space between, you will get more or less of a fire retarder; it will retard the progress of the fire, but I do not think will stop it, if the fire is of any intensity.

Secretary WILSON. Let me ask a question. It may be out of the abundance of my ignorance, but in these suggestions the thought has been running through my mind, To what extent would this air space add to the intensity of a fire when once a vent has been made into the air space—would it add to or detract from it?

Mr. BENNETT. I do not know that it would add to the progress of the fire, because the furring pieces to which the metal sheathing is attached will prevent a continuous draft. The air space to my mind will keep the surrounding wood outside the sheathing cooler than the steel sheathing and so prevent or delay its being charred and set on fire.

Secretary WILSON. I understand your viewpoint, that you make a cushion of air; but, having taken that precaution in that particular



way by putting an air space there, suppose that the fire, when it has originated, burns through into the air space, to what extent does it add to the intensity of the fire under those circumstances?

Mr. BENNETT. I think you would then be down to the same conditions in which you would be if the steel sheathing was not there; in fact, it would be even better, because the amount of draft would, I believe, be less.

The SECRETARY. Capt. Phinney, may I ask you a question? In introducing Capt. Phinney I would add that he is a man of long experience and also a representative of the Associated Factory Mutual Fire Insurance Cos. Capt. Phinney, is it not a fact that to place around the top of a stairway a vertical board partition, even though small and thin, whereby the hot air or flame is banked, so to speak, at the top of the room, that a simple partition like that will materially delay the passage of the fire?

Capt. PHINNEY. That is true up to a certain point. I have seen a pretty hot fire that would not burn through such an inclosure in a long while.

The SECRETARY. I think I was told by a representative of your companies that a wooden inclosure of this kind placed around the top of a staircase would delay a fire passing up that staircase from 10 to 12 minutes, even though the staircase was of pine.

Capt. PHINNEY. When that is made of seven-eighths-inch stuff, double, and matched, so that the cracks are covered, we accept it as fairly good.

I wish to say one word along the line of the recent suggestion about the air spaces. All our efforts have been concentrated on removing every possible concealed space from Mutual properties, and in proportion as we are successful in removing these spaces we feel that we have added to safety.

The SECRETARY. Capt. Phinney, may I ask, while you are on your feet, that you be good enough to state what your experience at sea has been?

**STATEMENT OF CAPT. C. H. PHINNEY, SECRETARY OF INSPECTION DEPARTMENT, FACTORY MUTUAL FIRE INSURANCE COS., BOSTON, MASS.**

Mr. Secretary and gentlemen, I have listened with great interest to what has been said, but feeling all the time that my experience has had very little bearing on river and inland navigation. I was 20 years at sea in sailing ships on deep-water voyages, and I saw the evolution of the sailing ship to the steamship. There were very few iron ships when I began, and there were very few wooden sailing ships left when I quit. My experience has been in carrying coal, East India cargoes, tea, grain, and general cargoes. The anxiety the shipmaster has to carry in his mind as to fire makes me realize that anything along the line of safeguarding the long-voyage ships is very desirable. When it comes to the ocean-going passenger ships, the big liners, it is almost criminal not to take advantage of the fire engineering art as it is developed to-day. Some of the large Cunard and German steamships have sprinklers in the lower holds; and I think that will extend without very much delay, for as soon as it becomes known that those ships are safer, passengers who have knowledge of it will prefer them.

In these large ocean steamships when a fire starts in the lower holds a dense smoke is quickly developed and this prevents the handling of hose streams to advantage, whereas if the ship is sprinklered the water is delivered immediately over the fire which will be extinguished or controlled in spite of the smoke.

I do not think it has been brought out here that the fact that the modern up-to-date ship with fireproof construction and all known fire prevention devices installed will have to compete, as regards business and freight earning ability, with an old-fashioned vessel without any of this expensive equipment, but in many cases able to compete on equal terms with the much more costly ship, and this would seem to call for some compensating arrangement to put them more on an equality.

The question of the weight involved in substituting steel for wood I do not think has so much bearing in a seagoing ship. In the first place the material used is heavier now. You can build these river boats and Sound boats very light, but a liner must be built very substantially. From concerns that are represented here to-day (The Fore River and the New York Shipbuilding companies) I had a few years ago some statistics which they furnished me on the cost as prices were then. The cost of substituting iron and steel for wood throughout the ship would not be greater than between 5 and 10 per cent, more likely nearer 5 per cent. I would be in favor of a thorough-going job. If you are going to take out some wood and leave some in, you fail to accomplish a good job of protection. We find in mill experience that if we leave any one place unprotected, that is the place where the fire will generally start and get away from us. I should want to get out all the wood. Ocean liners have not the chance of "running their noses into the bank" to land passengers, which advantage has been claimed for river boats; they must rely on their own resources. I think all of the wood should be eliminated. I think the advancing price of wood favors that, and will in the future.

The SECRETARY. Do you regard the sprinkler system as having been sufficiently developed to warrant its recommendation as a general safeguard on ships, both for the ocean and for inland waters?

Capt. PHINNEY. I wish to speak very guardedly about inland experience, as I have not given the same thought to it that I have to adapting the sprinkler system to seagoing vessels. I have no hesitation in saying that I fully believe it would almost remove the fire hazard in the case of an ocean-going vessel; and it seems to me the experience of the Fall River Line and of steamers on the Lakes is pretty good proof that there is no difficulty in adapting the sprinkler system to such vessels.

It seems to be impossible to use anything but a dry-pipe system. There are places about a ship where the water in pipes would be sure to freeze in cold weather so I think the use of the dry-pipe system on shipboard is inevitable.

The SECRETARY. Is that not a somewhat delicate system in its adjustments?

Capt. PHINNEY. Not seriously. In our experience we have not had a failure.

The SECRETARY. How large a pipe would you use?

Capt. PHINNEY. The same as in a factory. Of course it would depend somewhat on the nature of the layout. With the many turns and elbows that would probably be needed in installing a sprinkler system throughout a vessel it would not do to have pipe too small on account of friction loss.

The SECRETARY. How do you overcome the difficulty of storing a sufficient volume of water?

Capt. PHINNEY. By the use of pressure tanks, which are tanks of moderate size about two-thirds full of water and one-third full of air, the air being kept at about 100 pounds pressure by the occasional use of an air pump.

The SECRETARY. How much water would you carry for a ship of medium size?

Capt. PHINNEY. Well, with good discipline the pumps ought to be started in 5 minutes; consequently only sufficient water would be necessary for the first 5 or 10 minutes to supply a few heads until the pump should take the place of the pressure tank drawing an unlimited supply of water from the ocean, except in cases where a ship was laid up, and even then there should be somebody aboard who could start the pumps.

The SECRETARY. Do you regard the difficulty in respect to the storage of a reserve supply of water as serious?

Capt. PHINNEY. Not at all, in a vessel of any size.

The SECRETARY. Can it be readily so placed that it can flow to the sprinkler?

Capt. PHINNEY. It is forced there by the air pressure. As soon as the pump is started you have no further use for your tank.

The SECRETARY. How was it, as a matter of fact, applied on the freight and passenger steamers of which you have spoken?

Capt. PHINNEY. I have never examined the installation, but I have talked with the General Fire Extinguisher people, Mr. Grinnell and others. I have the drawings showing the sprinkler layouts of several of the ships.

The SECRETARY. What ships are they?

Capt. PHINNEY. I can hand you a list afterwards. The Fall River Line has been mentioned, and some others. But we have examined the layouts, and they are like the layouts in the mills; there is but little difference in detail.

The SECRETARY. I have had brought to my attention, Capt. Phinney, the possibility of a modification of the sprinkler system, whereby it could be adapted to marine use without requiring as much piping or as heavy valves or as much tankage as is used on land, by using the same materials which are common in chemical fire engines. Have you any knowledge of that?

Capt. PHINNEY. We have had no experience in our business except as we found it in our extinguishers. No building, to my knowledge, has been equipped by substituting that for water. Mr. Pryor, am I right?

Mr. PRYOR. I believe there are no buildings equipped with them.

The SECRETARY. But such a system is in existence.

Capt. PHINNEY. I will say this, that anything which will not take care of large fires I should not believe in. We have a saying in our department that a man ought to be hung that ever laid anything smaller than a 6-inch pipe.

The SECRETARY. We shall now be glad to hear from Mr. Berry, of the New England Steamship Co.

**STATEMENT OF MR. WARREN T. BERRY, SUPERINTENDENT OF MARINE CONSTRUCTION, NEW ENGLAND STEAMSHIP CO., NEW-PORT, R. I.**

Mr. Secretary and gentlemen, some of the shipbuilders present seem to think the owners are not particularly interested in fire protection. Possibly not all of them are, but some are particularly interested. I am fortunately employed by a company that is giving a great deal of thought to the matter, and I think there are many others; but, as the Fall River Line has been spoken of a number of times, I will simply review what has been done there. We operate not only the Fall River Line but lines between New York and New Bedford, New London, New Haven, Providence, and Bridgeport. All our steamers have steel inclosures extending through all decks around engine rooms and funnels. This is practically universal on steamers of the Sound type, recently built. We have utilized various fire-retardant, composite boards in recent construction wherever possible, and are more than willing to adopt any fire-retardant or fireproof construction which is adaptable to our service. Our steamers *Commonwealth* and *Plymouth* are fitted with fire-retardant bulkheads, dividing the vessel into three parts; the cargo spaces are lined throughout with galvanized sheet steel, and the entire interior of each vessel fitted with sprinkler systems. Our freight steamer *Pequonnock* is also fitted with a sprinkler system in the main deck cargo space, making three steamers in all with sprinklers.

The SECRETARY. How does it operate?

Mr. BERRY. We have never had occasion to operate it, fortunately.

The SECRETARY. On what principle does it operate?

Mr. BERRY. It is a dry-pipe system, manually operated. The pump is controlled by a governor, and a pressure of 100 pounds is maintained to a manifold in the engine room. Beyond that the water is not allowed to go except in case of necessity. We do this for various reasons. The weight of water which would be contained in a sprinkler system all over the vessel is a very serious proposition, not from its percentage of the total displacement, but from its location as affecting the stability of the vessel. Furthermore, it could not be protected in the open cargo spaces from freezing in the winter. The *Pequonnock* was originally fitted with an automatic dry-pipe system, controlled by an automatic valve which admitted water to the system upon the opening of any sprinkler head. While this system seems to operate successfully in many places, our experience with broken sprinklers on the *Pequonnock*, where freight is stowed close to the sprinklers, led us to abandon the automatic valve and decide that the manually operated system was the only one we could use. Further experience has led us to believe that a sprinkler pipe discharging water into passenger quarters in case of collision would be very serious, in that it would create panic among passengers. Our system, therefore, is manually operated from a manifold in the engine room. In connection with the sprinkler system there is a thermostat system arranged in circuits corresponding with the sprinklers.

Mr. MYRIK. I should like to have you, if you will, give the procedure from the time the alarm comes in—how long it takes to do it.

Your pump is going with a pressure of 100 pounds up to your manifold. Now, then, an alarm comes in.

Mr. BERRY. It is registered on an annunciator within 10 feet of the manifold. The drop of section No. 20, we will say, on the saloon deck forward, port side, comes down. A man simply steps over to the manifold and opens valve No. 20 and his mission is fulfilled in so far as the operation of the sprinkler system is concerned. It is necessary to divide sprinkler systems into circuits, because the size of the piping is limited to some extent; and I believe this is the common practice in sprinkler engineering. There are other steamboat lines which have installed the automatic system. One is the Goodrich Line, of Chicago, which has three entirely automatic systems. We are not yet convinced that this is the proper thing to do.

We have gone into all-steel construction very much in detail. Mr. Taylor has told you the result of the estimate of weights on the *Plsmouth*, and I have recently estimated the weights of such construction on a small passenger and freight steamer 190 feet, water-line length. On that steamer the joiner work, as usually built of wood above the main deck, was estimated to weigh 77 tons. The construction considered was practically all steel except the decks and deck carlins, and resulted in an estimated increase of 46 tons, or between 60 and 70 per cent of the total weight of that portion of the vessel. Steel decks above the main deck were not considered because of the prohibitive weight.

This entire question is so very large that it can not be thrashed out at any one meeting. It should be considered by a committee or by a commission that will be in session at all times. The art is advancing every month; changes are being made every month. It is going to be a very serious handicap to apply many of the things that can be done in new construction to old construction. Boats of this country can not be revolutionized by any rules or regulations unless it is decided to throw them all away and build all new ones. There are many things that can be done, however. I believe that the recent rule approved on April 8, requiring sprinkler systems or steel sheathing for cargo spaces, is a good one. There is only one trouble with it. It does not go far enough. It should have specified what the requirement for sprinklers was and not leave that to the discretion of assistant or local inspectors in various parts of the country. Their ideas on the subject must necessarily be very different one from another, and sprinkler engineering has advanced far enough to-day so that it would not be a difficult proposition to make specifications and incorporate them in the rules, which would produce an efficient system and not leave it to anyone's discretion.

The SECRETARY. Do you think it is possible to make a standard specification of general application?

Mr. BERRY. A general specification? Yes, sir; I do. The spacing and type of sprinklers, the number of circuits allowable, the number of sprinklers to each circuit, the size of the pipes, and the size of the pump could be specified on all installations. I am not at all sure, however, that all existing steamers can be properly sprinkled without practically rebuilding them. This is a matter which requires considerable thought and investigation.

The SECRETARY. But would you say that most steamers could be very much safeguarded in that way?

Mr. BERRY. Anything done in the line of retarding fire by sprinkling even a portion of the vessel, by the use of asbestos board, composite boards, steel sheathing, steel in place of wood—all help.

The SECRETARY. You have reference, however, if I understand you correctly, Mr. Berry, to a manually operated system?

Mr. BERRY. That is what I personally believe in, what my company believes in. There are other companies and other men who do not agree with that.

The SECRETARY. Do you know whether these other companies and other men of whom you spoke have encountered any serious practical difficulties in the operation of those systems?

Mr. BERRY. They advise me they have not. Mr. Goodrich can probably tell you of his experience. He has had his experience and we have had ours. The operating conditions vary considerably, and the experience varies accordingly. Sprinkler systems are comparatively new things on shipboard. They have not been developed, possibly, to the extent they will be in the future. One thought that occurs to us is this. Suppose one of our boats is struck by another vessel and considerable joiner work destroyed. What will be the result if in the course of that destruction one or more sprinkler pipes are broken and water is discharged into passenger quarters? We believe it would create panic among the passengers who may be there, and we are willing to sacrifice, if you please, some portion of the protection from fire which might be obtained from the automatic system to avoid the possibility of panic among passengers. That very condition has arisen on our steamers. The *Commonwealth* was in collision with a Norwegian tramp off New London, which carried away some of the joiner work forward, and the sprinkler pipes were very badly damaged. We believe that if there had been water running through those pipes it would have created a panic, which fortunately did not occur.

The SECRETARY. I do not know that it is quite clear to my mind, Mr. Berry, why that should create a panic, why there should be a tendency toward creating a panic. I can well understand that if anything in the way of water coming from below, fire from below, or anything of that kind would have this tendency. But a shower of water from overhead. What is the point of view, that they are panic-stricken, scared because they think the ship is going down?

Mr. BERRY. They are on edge on account of the collision. Can you imagine a farmer from Massachusetts occupying a stateroom and the side of that stateroom being ripped out and water from perhaps a 3-inch pipe descending on him?

The SECRETARY. In a stateroom?

Mr. BERRY. Yes.

The SECRETARY. You mean it breaks the main pipe?

Mr. BERRY. Yes, sir; the main pipes go through staterooms in order to supply other staterooms. That gentleman would come out into the saloon and "raise some riot." It does not take much to create panic when anything unusual happens on shipboard.

The SECRETARY. Is it not the experience of sprinkler engineers that anything which is not perfectly automatic fails at the critical time?

Mr. BERRY. Yes, sir.

The SECRETARY. I have not any views on the subject. I am trying to get your views clearly.

Mr. BERRY. Yes, sir; there is the possibility of such failure. Our system requires the human element, which we prefer to accept rather than to incur the risk of panic of which I have spoken.

The SECRETARY. Suppose you were now designing another ship for a similar service. What changes would you make in her, being given a free hand?

Mr. BERRY. I do not know that we could make any material changes in the steamer *Commonwealth*, for instance. It is possible that various composite boards now produced would be advantageous to use. We would not be inclined to make any changes in the sprinkler system. I do not believe it is possible to make any changes in the character of the decks. Possibly steel might be substituted in minor quantities here and there for wood in various parts of the standing structure. Beyond that I do not know what we could do. We would like to be told if there is anything that can be done.

The SECRETARY. I thank you very much, Mr. Berry.

Gen. UHLER. I would like to ask Mr. Berry just one question. There seems to be some doubt, Mr. Berry, as to the cause for panic. Is it not the fact, and is it not the experience generally, that anything out of the usual, particularly at night, will create panic, as in the case of a collision, where they feel the bump? They know that something has occurred, and then they are deluged for the time with water coming from above.

Mr. BERRY. They do not care where it comes from.

Gen. UHLER. Is it not the fact that anything out of the usual, and particularly at night—

Mr. BERRY (interrupting). A boat stopping in the middle of the night will bring people to the stateroom doors with their heads out. It needs only one man to start those people on a rush somewhere; they do not know where.

Mr. MYRICK. May I say something on this subject of thermostats. I was fortunate in having a fire and boat drill held for my benefit on the steamer *Providence* on the dock at New York. We went to the stateroom on the topmost deck and started the alarm through the thermostat. In 17 seconds by the watch there were two stewards, each with a fire extinguisher, at the stateroom door. In less than a minute there were seven streams of water being played over the sides. In the boat drill a minute and a half from the time the bell was rung there was a boat being rowed out to the dock.

The SECRETARY. Did they know the drill was to come off?

Mr. MYRICK. No, sir; they did not.

#### STATEMENT OF HON. WILLIAM B. WILSON, SECRETARY OF LABOR.

Mr. Secretary, it will not be possible for me to be back here this afternoon. May I say a word just before I go?

It has seemed to me from the statements made to-day by men who are in the best position to be familiar with the subject that there is possibly a great deal of information that might be made available if it was made somebody's business to go after it, get it, and collate it; and that when you had that information available you would be in a better position to determine the remedies which should be applied. I think that is true particularly with regard to the question of materials. I think it is also true with regard to some phases of construc-

tion. And I want to throw out this suggestion, that it might be well to have placed in the hands of the Department of Commerce, the Department of Labor, and the Navy Department the selection of a commission composed of representatives of the three bureaus in those departments that would be interested, to undertake the work of gathering, compiling, and putting into proper shape the information that seems to be needed for the proper consideration of the question of preventing fires on ships and their control and extinguishment when they occur. When that has been done you would be in a position to determine just how far remedies could be applied to old vessels, and to what extent they could be applied to vessels hereafter constructed.

I thank you, Mr. Secretary, for the opportunity of being present, and I am sorry I can not stay longer.

The SECRETARY. I am going in a few moments to ask Mr. Du-Bosque of the Pennsylvania Railroad to express his views, but while what my friend, Secretary Wilson, has said is fresh in your minds I want to suggest something to you along that same line for you to think of; and that leads me also to say certain things before I commence the suggestion.

I should like to have you think over the question whether there should not be a committee appointed before we close this afternoon, a committee to cooperate with us in developing this matter further. I want to say also that I hope we shall have these proceedings all transcribed, and proof will be sent to each of the gentlemen present of what they have said, and we shall consider it not a discourtesy but a favor if they will alter, enlarge, or contract their remarks as they see fit. We shall then hope to have the proceedings in shape for the general use of you all and those whom you may desire to have them, so that the fullest possible light may be thrown upon the problem. We are not here to lay down law but to get the truth.

Now along the line of what this committee might do, and following Secretary Wilson's suggestion: We are in constant touch in the Bureau of Standards with all the great engineering societies of the country; are working with them all the time. There is not one of them but has its own committee operating with the Bureau of Standards continuously. We have been for two years at work all the time upon the study of the law of columns for the American Society of Mechanical Engineers and the American Society of Civil Engineers. There is a constant committee representing each of the great technical societies that cooperates with that service. We are in a position, for example, to take this question that Mr. Olcott referred to, this question of fibers, and undertake a study that no paper mill could ever afford to make of the development of fire-proof fiber. We have got a paper mill of our own. We have the only plant, I think, in the country which is able to test the fire-resisting quality of materials on a very large scale. We are doing it all the time. We do it on a very large scale, indeed. We take building panels of any material, any kind of material, 16 feet square, and destroy it by fire, employing a uniform, known temperature, knowing what we are about.

Now all that is at the service of your industry without expense if it wants it, and I think there is hardly one of the great technical industries of the country that is not in touch with the force of 350



scientific men that we have at the Bureau, with the finest research laboratory in the world, which cost over \$1,000,000.

It occurs to me that it may be desirable to have some studies made of the things which are not now done but which ought to be done if it can be done. We are doing that for all sorts of industries, the American Cotton Oil Co. and the electrotyping industry. Every steel mill in the Nation operates in accordance with the standards made there.

That is the thing I want you to have in the back of your minds the rest of the day. In some way I think you ought to have at your beck and call an instant knowledge of what is being done at the Forest Products Laboratory, where wood is being studied in the same scientific way and without any prejudices or folly. They have developed some very surprising things, too, not for the interest of any man or for any inventor, or anything of that kind, but for the interest of the country at large. We could get very readily a representative of that very important service who would put at your disposal certitude on these matters, free from any manufacturer's interest.

There are two lines, it seems to me, where the possibilities are open.

Mr. DuBosque, will you now express your views as frankly as you care to do?

**STATEMENT OF MR. F. L. DuBOSQUE, ASSISTANT ENGINEER, THE PENNSYLVANIA RAILROAD CO., NEW YORK, N. Y.**

Mr. Secretary, the company I am connected with is an enthusiastic advocate of fireproof construction, and we have succeeded in producing fireproof ferryboats, tugboats, and barges; but after listening to the remarks made by the gentlemen that have preceded me, I can appreciate the difficulties to be overcome in building a passenger steamer with sleeping accommodations of fireproof construction.

It is rather a simple problem to build a fireproof freight barge, some difficulties have to be overcome in building a fireproof tugboat, and quite a number of problems are involved in the construction of a fireproof ferryboat. This company fortunately has at its command the facilities of a very complete laboratory and test department, enabling them to experiment with the various fireproof materials that might be used for construction work, and to determine the minimum steel sections that could be used in the supporting structure, together with the best method of fastening them together. Unfortunately, very few shipbuilders or shipowners have such complete facilities for making the necessary experiments.

One of the important features in designing passenger steamers is weight; and while a 10 per cent increase in weight does not seriously affect the efficiency of a ferryboat, this increase would be quite objectionable on the modern passenger steamer, and our experience in experimenting with various fireproof materials leads us to believe there would be considerable difficulty in producing a fireproof passenger steamer at this time. However, we believe that some progress should be made in this direction on all steamers, and that a start should be made.

It would seem proper to commence on ferryboats, but if we do so it would be necessary to classify the type of ferryboat to be so con-

structed. Under the law any type of boat from a small launch upward in size can be construed as a ferryboat. Therefore it seems that it would be somewhat difficult to comply with a law requiring all ferryboats to be of fireproof construction. Instead of enacting a law that would apply to every type of passenger steamer, would it not be better to frame the statute so that your Department would be the arbiter on the type of construction to be used in these vessels? Fireproof materials can be used to a considerable extent on all types of boats, and under such an arrangement your Department could, when designs of vessels were submitted to you, indicate what part of the vessel it would be practical to construct of fireproof materials. Rules that apply uniformly to all types of vessels are a mistake, and numerous instances can be cited where this practice interferes with instead of aiding the efficiency in operation and protection to vessels. Rules should be made in such a way that they can be modified to suit the particular type of vessel to which they are applied.

Your suggestion to appoint a committee to investigate the practicability of fireproof construction is excellent, and will result, I am sure, in specifying that certain types of vessels should be of fireproof construction, and a start will then be made on this desirable feature.

The SECRETARY. Mr. DuBosque, what, in general, was the construction that you used upon your fireproof ferryboats?

Mr. DuBosque. The hulls are built of steel of the usual construction, the deck beams are of steel, the sides of the cabins are of thin steel plate supported by steel stanchions of H section, to which they are riveted. The decks are of steel plates supported by steel angle bar beams. Ferryboats, fortunately, have a bulkhead extending from end to end of the boat and from the main to the upper deck, and this, together with the steel center house, provides an intermediate support for the upper deck beams, which reduces the span of these beams so that very light beams can be used, and in this respect ferryboats have a great advantage over the passenger steamer. The interior of the cabins is covered with panels made of an asbestos cement material and these panels are held in place by steel moldings. There is no exposed wood on this ferryboat except the deck covering in the vehicle space. No substitute could be found for wood for this particular part of the boat.

The SECRETARY. The deck underneath that is of steel?

Mr. DuBosque. Yes.

The SECRETARY. Of what material are the seats in your cabins?

Mr. DuBosque. The seats extend continuously along the sides of the cabins, and on the first boat built these were constructed of steel covered with so-called "insulating" paint. There was considerable objection on the part of the passenger traffic because the seats were cold to sit on, and on the subsequent boats the seat frames were made of steel, covered with cherry slats three-fourths inch thick.

The SECRETARY. How many boats of the general fireproof class have you operating?

Mr. DuBosque. Four.

The SECRETARY. Are they of a standard type?

Mr. DuBosque. They are of a standard type and similar. Future boats will be built of this type with such improvements as we can make.

The SECRETARY. I will ask Mr. Croker, former fire chief, to express his views to us.

**STATEMENT OF MR. EDWARD F. CROKER, EX CHIEF NEW YORK FIRE DEPARTMENT, NEW YORK, N. Y.**

Mr. Secretary and gentlemen, I have been very much interested in the discussion, both pro and con. During my experience in the New York fire department naturally I have been to a great many fires and a great many fires on various kinds of boats. At that time I was also a member of the building department and a member of the board of examiners of New York. The building department, of course, approves all plans for construction of boats, etc. The board of examiners acts as a board of appeals from the superintendent of builders. If any builder objects to the superintendent of builders, he has a right to appeal to the board of examiners. Therefore they can never lay down any rule that would cover all buildings in New York. The same is true with the construction of boats, with the supervision of boats. You can not build them all alike. One boat may require sprinklers and another boat may not require them. Some boats may be built semifireproof and some should not be. It has been my experience, Mr. Secretary, that you can not lay down any hard and fast rules.

But your remarks on the opening of our meeting seemed to me to strike the nail on the head. Fires should not occur, and if they do they should not be allowed to extend. My experience with fires has been that 99 fires out of every 100 are due to what you may call poor housekeeping; boats are not properly inspected, accumulation of dirt, of rubbish, of oil waste. The paint rooms on a majority of the boats ought not be aboard a boat. Your rope rooms, your galleys, your quarters for your help, particularly for men, are breeders. I have been aboard a number of boats, one last summer, outside of New York Harbor. I will not mention any name. I asked the captain if he would have a fire drill. He said, "All right; good idea." He sounded his fire alarm. Some of the men came to quarters. They did not know whether it was on the port side or on the starboard side. They did not know where boat No. 1 was nor where boat No. 8 was. They lowered a boat and did not know how to row. Such things as that are what cause loss of life.

When they go to inspect a building in New York they go to the breeders, not to the high-class buildings. A lot of the boats floating around our harbors, many of them around New York, ought not to be allowed afloat. The companies that own good boats, the Albany Day Line and others, have got to be the sufferers. It is unfair to establish fast rules. It would not be fair to have someone come along here [indicating] and put up a 4 or 5 story frame building which would jeopardize you.

A great many things can be done to decrease the fire hazard. I saw a test of a fireproof paint made by the department of docks and the department of bridges, which they adopted. The paint does not cost any more than ordinary paint. They tested it by blowpipes until they burned a hole through an inch board, and it did not take fire.

The air alarms, such as they use on the Albany Day Line, I think are the best detector of anything I ever saw. You take a newspaper

in this corner of the room and have your air alarm in that corner of the room [indicating], and light it, and the heat generated by that newspaper in 15 to 25 or 30 seconds will give the alarm. It costs very little and is very efficient.

My experience has not been very great with fiber boards.

Some gentlemen here spoke about air spaces. It has always been a custom of firemen throughout the country to stop all air spaces where possible. Air spaces are where your fire will get away from you.

Asbestos board was also mentioned. Asbestos board is very nice and absolutely fireproof, but it is heavy and expensive.

In the fire department of New York they approved fireproof wood for several years, but found out that the wood would deteriorate in time. We have had a number of fires in buildings furnished with fireproof wood which have been quite serious.

As to sprinkler systems for boats, on all freight-carrying and passenger boats, I think they should be equipped with sprinklers. They have advanced to a state of perfection. They are practically new, so far as boats are concerned, but there is not a bit of difference between the equipment of a boat and that in a building.

Dry systems: From a fire standpoint, we never depend on manual when we can get automatic. If there is a panic, maybe a little water on some of them would quiet their panic. A crowd is queer. The police sometimes disperse a crowd by sprinkling a little water on them.

Wire glass can be used on boats to good effect. Wire glass set in metal frames is an A No. 1 fire retarder. The principal thing is to prevent your fire; do not let it occur. Have proper inspection of your boats to see that everything is kept clean; have your fire appliances inspected monthly; have an organization on board your vessel to handle your fire appliances and to know what to do in case anything happens.

There is no reason why people should take a panic just because a little fire occurs. It is easy to put it out with proper equipment and proper organization.

They claim there is not much danger of fire on these excursion boats; but the *Slocum*, within 500 feet of shore, lost 1,000 people. They could have run their nose ashore any time they wanted to. And other boats—the North German Lloyd liner in Hoboken was burned—and look how many people were lost and how many other ships were destroyed there.

The Albany Day Line boats: I think if the majority of all boat builders would take an example from the construction, care, maintenance, and cleanliness of their boats, we would have very few fires, because they certainly have gone to the extreme on construction and fire appliances and maintenance and inspection and drills.

There is a lot more to be said about fires and one thing and another, but many of the people here are in a hurry to get home, and I will not take any more time. I shall be glad to answer any questions.

Mr. TAYLOR. Mr. Croker, you said there was no reason why people should get into a panic in the case of a small fire, did you not?

Mr. CROKER. I meant the crews on board the boats. I should like to correct that. People are the most panicky things on earth. In

the case of the Triangle fire they jumped out of an 11-story window when they could have run downstairs.

Mr. BROCK. Mr. Croker, what has been your experience with metal furniture in fires in New York? Have you found that it burned up? Have you found that it acted as a retardant?

Mr. CROKER. I never knew it to burn up.

Mr. BROCK. The statement was made that steel would burn up. Would you consider a steel building equipped with steel furniture as absolutely fireproof?

Mr. CROKER. No.

Mr. BROCK. An entire steel equipment?

Mr. CROKER. No.

Mr. BROCK. With nothing combustible inside the building?

Mr. CROKER. Of course, you can take a stove without any fire in it and it is incombustible—do not have any fire in it, or any fuel, or anything else, then it is fireproof.

A VOICE. I have heard it stated—as a matter of fact, take the Iroquois Theater in Chicago—that was a fireproof building, but more people were lost there than on the *General Slocum*; I have heard it stated that the proportion was greater.

Mr. CROKER. The people were lost by panic. There were only 12 of the audience that the flames came near; they were “smoked up”—suffocated.

The SAME VOICE. But their lives were lost; it was the same thing.

The SECRETARY. Thank you very much, Mr. Croker.

Mr. Magoun, we shall be glad to hear from you if you care to express your views.

**STATEMENT OF MR. HENRY A. MAGOUN, VICE PRESIDENT, NEW YORK SHIPBUILDING CO., CAMDEN, N. J.**

Mr. Secretary and gentlemen, I have very little to say. A shipbuilder is in a different position from an owner. He has two positions, so to speak. He tries to build what is given to him to build, and at other times he both designs and builds. In the case of our company, we have built some of the boats which have been spoken about here to-day. We built two of the Hudson River Day Line boats, and one of the Pennsylvania ferryboats. And I want to correct any impression there may be that the owners are not anxious and trying to do all they can to prevent fire. All owners I have had to deal with are anxious to do so as far as the state of the art gives them any knowledge of how to do it. We are constantly changing and improving, and the shipbuilder is always willing to do all he can, so far as his knowledge goes, to help the owners.

It is very true that it is impossible to make a rule which can be universally applied to all vessels. We have so many different kinds of vessels, as well as of construction, that I do not know how it can be done. The suggestion of appointing a committee is probably the most practicable way to accomplish anything. It has been stated to-day, referring to construction on the Lakes, that no passenger boats were being built. It is about the same thing in all the yards on the coast. They are building all kinds of freight vessels.

The owners are keenly alive to the possibility of fire and are doing all that they can to prevent it. I may mention one thing. We

frequently speak of a fireproof structure. I have always been brought up to believe it was perhaps an impossibility. If the thing itself is fireproof, the contents are not. The first information I ever had on the subject came from Edward Atkinson, who explained the slow-burning principle at great length. It is our practice to make them slow burning.

The SECRETARY. Gentlemen, the time for luncheon has come. We have had a very frank discussion. I think, although it is a "town meeting," we have managed to have some very frank talk, and I hope we shall have more. What I should like to have happen this afternoon is to have you select a committee—I do not want to select it—to have you select a committee which may cooperate with the Department, very much as the committees of the technical societies of which I spoke are doing all the time, and make a more or less continuous study of this matter.

We have an example here of the value of such a committee. The motor-boat law of this country is about as bad as it can be. If I got started to talking of the faults of the motor-boat laws you would never get any lunch; but we had a conference just like this, perhaps the father of this. We went into all the ends and corners and sides of the motor-boat business; and the bill which is pending in Congress is unanimously supported by the motor-boat people. It arose out of a conference and out of the labors of that committee, which chewed the subject over for many months and ended by unanimous agreement. Their report did not embody the extreme things some of them desired, but they got together, in a common-sense, practical way, on what was, after all, a very considerable advance.

That, I think, we might accomplish here; and so, before we meet again—I would suggest 2.30 p. m., if that is not too early or too late for you—let us think that over and see if we can this afternoon get a committee appointed without any rigid rules—a committee which can add to its number as freely as it desires and can do anything it chooses on the subject—and at least get a start. We want such a committee to guide us against making mistakes. We need to be guided against mistakes as much as anybody else—if we believe the newspapers, more so—and we will try not to make any more mistakes in the matter than that committee will let us.

(Thereupon, at 12.37 p. m., the conference was adjourned until 2.30 p. m.)

## AFTERNOON SESSION (2.30 O'CLOCK).

The SECRETARY. Mr. Goodrich, your name was mentioned this morning, and we would like very much to get upon the record a statement of your experience in protecting the vessels of your company from fire, especially with the automatic sprinklers you are using.

Mr. GOODRICH. We have some steamers equipped with the automatic sprinkler system, known as the dry-pipe system. The others are equipped with open-head sprinklers. They are arranged in groups—rather a crude affair.

The SECRETARY. When you speak of open sprinklers you refer to those manually opened, I suppose?

Mr. GOODRICH. Yes; by a valve in the engine room, and the valve permits the water to flow through a given number of heads at the same time, covering a given area.

The SECRETARY. You say it is the dry-pipe system.

Mr. GOODRICH. We could not use anything else because some of the boats we have operate the year around. In weather such as we have on Lake Michigan, it being frequently several degrees below zero, anything that contained water would be useless.

The SECRETARY. Where do you carry your reserve water supply?

Mr. GOODRICH. We do not carry any.

The SECRETARY. You do not carry any?

Mr. GOODRICH. No, sir; not for the sprinkler system.

The SECRETARY. You carry air pressure?

Mr. GOODRICH. The air pressure in the pipes of the automatic sprinkler system is maintained by a small air compressor. When the pressure is relieved by a sprinkler-head opening the pump connected with it starts pumping automatically. There is always steam on it and generally is in motion, moving very slowly. The other pumps intended for pumping water on the boat are so connected that they can be thrown into the sprinkler system.

The SECRETARY. So that you depend upon the acceleration of the pump to supply you with water?

Mr. GOODRICH. Yes, sir.

The SECRETARY. You do not use any reserve water at all?

Mr. GOODRICH. No, sir.

The SECRETARY. Has there been any occasion for the system to work at a fire?

Mr. GOODRICH. We never had a fire on any one of the three boats on which we have the automatic system. We have tested it at different times by taking a torch and touching off a head just to see the thing work, but it has never been used in an actual fire to my knowledge.

The SECRETARY. Did it work when you tested it each time?

Mr. GOODRICH. Oh, yes.

The SECRETARY. Your largest boat is the *Christopher Columbus*?

Mr. GOODRICH. Yes, sir.

The SECRETARY. What have you done in the construction of the vessel in the way of fireproof materials?

Mr. GOODRICH. We did not build her. We bought her.

The SECRETARY. Where was she built?

Mr. GOODRICH. At Duluth, or really at West Superior, across the harbor from Duluth.

The SECRETARY. Has she no special appliances for fire?

Mr. GOODRICH. There is nothing on her to burn. She has three heavy steel decks, without any wood on them; that is, her main deck has no wood on it, the deck above that has some wood finish, and the deck above that has a wooden floor laid upon it, a light wooden floor; and sprinkler system.

The SECRETARY. What are the houses made of?

Mr. GOODRICH. Wood.

The SECRETARY. Have you used any bulkheads to restrict—

Mr. GOODRICH (interrupting). No; there is nothing in her at all. Of course she is a peculiarly designed thing. Her stairways are all isolated in steel inclosures.

The SECRETARY. Did you do that?

Mr. GOODRICH. No; that was there originally.

The SECRETARY. She is of the whaleback type?

Mr. GOODRICH. Yes, sir.

The SECRETARY. If you were to build another, and based upon your experience with her, what would you do with regard to restricting fire?

Mr. GOODRICH. Well, we would not build one, to start with.

The SECRETARY. What I want to get at is, what lessons do you think can be learned from the experience with the vessel as regards fire-restricting construction?

Mr. GOODRICH. I do not know. That is a rather unending discussion. It all depends upon the type of vessel and what you want to accomplish and what you are going to use it for; where she is going. So many things enter into it that it is rather difficult to answer offhand.

The SECRETARY. Does anyone wish to ask Mr. Goodrich a question?

Mr. MYRICK. Mr. Goodrich, I had the pleasure of seeing your ship the *Alabama*, I think it is.

Mr. GOODRICH. Yes, sir.

Mr. MYRICK. Would you be good enough to tell us about her construction?

Mr. GOODRICH. Well, in what respect?

Mr. MYRICK. In all respects so far as the hull is concerned. She has steel decks. She is built of steel?

Mr. GOODRICH. Yes, sir.

Mr. MYRICK. She has two steel decks, has she not?

Mr. GOODRICH. Yes.

Mr. MYRICK. So that the only woodwork you have practically, outside of that down below, is in your superstructure?

Mr. GOODRICH. That is all. She is all steel below. There is no wood below the main deck. Everything below the main deck is steel. The main deck is steel. The engine room is in a steel inclosure, and goes up about 30 inches above her upper deck and the same around the smokestack casing. Then she is automatically sprinkled. All the inside staterooms have sprinkler heads in them.



The SECRETARY. On the same system?

Mr. GOODRICH. Yes.

The SECRETARY. Did you take into account the question of panic when you put in those automatic sprinklers?

Mr. GOODRICH. No. Our idea was to save the boat in case of fire.

The SECRETARY. Are you not afraid that when she is crowded with passengers some day there may be great excitement from the breaking of a pipe?

Mr. GOODRICH. We can not help that. We can not guarantee everybody's sanity. We simply went at it with the idea of saving the boat and making it as foolproof as possible. That is why we believe in the automatic sprinkler as against the open-head sprinkler.

The SECRETARY. So far as the system is concerned—

Mr. GOODRICH (interrupting). We have had no trouble with it. It has of course a great advantage over the open-head system because of the smaller quantity of water required.

Mr. BENNETT. Mr. Goodrich, what system of automatic control have you for the sprinkler heads?

Mr. GOODRICH. I think the company that did the work was the General Fire Extinguisher Co., of Chicago.

Mr. BENNETT. I understood from Mr. Goodrich that it was a dry-pipe system. I want to know by what means they transmit the water back to the place where they operate this—

Mr. GOODRICH (interrupting). By the liberation of the pressure of the air. When the head opens the air rushes out and the water follows it.

The SECRETARY. It works automatically.

Mr. GOODRICH. Just the same as any dry-pipe system that you put in an unheated building.

The SECRETARY. Mr. Benns, have you any suggestions?

**STATEMENT OF MR. CHARLES P. BENNS, ASSISTANT MANAGER  
UNDERWRITERS' ASSOCIATION OF THE DISTRICT OF COLUMBIA,  
WASHINGTON, D. C.**

Mr. Secretary and gentlemen, I have only one thought that occurs to me now and that is, that on land a great deal has been done in the way of fireproofing and of fire protection. Many lessons have been learned. It is undoubtedly not possible to transfer those things bodily to the marine field. Nevertheless, I believe that the fundamental principles are the same. When you started the discussion this morning, Mr. Secretary, you spoke of the work of Mr. Atkinson, who not only formulated the problem as you outlined it but who proceeded along very definite lines under each one of those particular heads. In the first place, for the preliminary extinguishment of the fire, or rather, we may say, that the fire might not occur, he used to the extreme the good housekeeping that Chief Croker spoke about. In order that the fire might not spread, he did away entirely with the construction which called for concealed places, making everything of solid wood and the exposed surfaces smooth, so far as was humanly possible, and if the fire did start and did spread he applied the automatic sprinkler for its extinguishment and control.

Those same things, of course, apply to the work that has been done on shipboard and on the steamboats, but my thought is that it would be most unfortunate to attempt to take the sprinkler system as we

are familiar with it in buildings and transfer it bodily to a steamboat. The questions in regard to reserve water supply, the questions in regard to the size of pipe—all of those things I think can be modified according to the conditions found on shipboard. As regards the question of the subdivision of the vessel, I think we can learn a good deal from the conditions of the subdivision of buildings, but no one of course would think of putting up a terra cotta wall on board ship to make the division. On the other hand, a great deal of experiment, a great deal of experience, is concentrated in what we know now as standard tin-covered fire door; that is, one in which there is a wooden core, made very rigid, very smooth, covered with tin in small sheets. Of course those things are all details, but after all it seems too bad that our marine engineering friends are still experimenting with woodwork, with large sheets that are insufficiently fastened to the wood and which are absolutely necessary, judged by the experience on shore, to the protection of the wood.

The SECRETARY. How do you fasten those sheets together? Are they not crimped, and nailed under the crimps?

Mr. BENNS. Yes. As you suggested this morning, the sheets are so arranged that you get nailing all over the surface. The forerunner of that was the single sheet. The single sheet had to be of appreciable thickness in order to enable it to be nailed and not have the nails tear through. That door has stood all sorts of fires. It has been improved. I suppose that that standard metal-covered door has been experimented with for the last 20 years and is used for openings up to approximately 8 or 9 feet square. We think we have got a pretty good method of closing that particular kind of opening. It seems as though it ought to be possible to extend that fundamental principle to the making of a bulkhead across a vessel which would not be excessively heavy and which would resist the fire that it may be subjected to.

My thought is that in the formation of this committee that is under discussion to-day there should be some member that will serve as a very close line of connection between the experience of the underwriters in taking care of fire risks on shore and the skill and experience of the marine designers and those that are altogether more competent to judge of that side of the question.

The SECRETARY. Mr. Benns, am I correct in recalling that it is considered good practice to keep those doors bright and not have them painted?

Mr. BENNS. I believe they are not laying as great stress upon that now as was formerly the case. Of course, I think it is quite well recognized that fire will flash over a painted surface. Chief Croker spoke this morning of fire-resisting paint. It occurs to me that many times in repairing a building that has been subjected to fire we simply ask that the charred surface of it be scraped off and then give it a coat of whitewash. Under ordinary conditions the presence of that whitewash will not make it as liable to fire as if it was exposed.

The SECRETARY. I thank you very much, Mr. Benns. Does anyone want to ask Mr. Benns any questions?

Mr. French, you are the chief surveyor of Lloyd's Register of Shipping?

Mr. FRENCH. Yes, sir.

**STATEMENT OF MR. JAMES FRENCH, CHIEF SURVEYOR OF LLOYD'S REGISTER OF SHIPPING, NEW YORK, N. Y.**

Mr. Secretary and gentlemen, the subject before us appeals to me both from a public and from a naval architect's point of view, and from the latter viewpoint the question is certainly fraught with difficulties.

I would like to say straight off that I do not think it is possible to design any vessel to be both practical and fireproof, but at the same time we can go a long way toward minimizing the danger and spread of fire by adopting methods of fire fighting and fire resisting.

Of the vessels at present under discussion I consider that quite a different standard should apply to the Lake or Sound type of boats which carry a large number of passengers throughout the night as compared with daylight excursion and similar class of steamers which are never far from land and where practically every part of the vessel is under almost constant observation by some one or other.

The question of sprinklers and fire-fighting appliances has been discussed pretty fully, and I consider a great deal can be done toward securing quite reasonable safety in this latter type of vessel by such means. In the former type I consider the actual design of the vessel should be made to some extent subservient to a system of fire-resisting bulkheads, so as to limit the spread of any outbreak which for the time being might get beyond control of the fire fighters, due to its not being detected in time.

In a discussion of this sort there is so much to say and so many to say it that I fear we can only generalize, but I have no doubt that if a committee is formed, as suggested, representative of naval architects, owners, sprinkler engineers, and others tentative recommendations could very well be drawn up with every possibility of arriving at something which, while not fireproof, might approach it.

The SECRETARY. That is a very comforting thought, Mr. French, coming from a man of your experience.

Mr. FRENCH. The whole subject will require careful thought and must eventually result in a compromise between the safety of the traveling public and their comfort while traveling. I think your committee must bear this in mind and when they have elucidated everything of value from our present discussion and added to it from their further experience, it might be presented in the form of a concise report for still further discussion.

The SECRETARY. Have another conference later.

Mr. FRENCH. Yes; it would be impossible for a conference of this size to draw up such a report.

The SECRETARY. Your idea would be to have the committee think this thing over and then come together later.

Capt. Phinney, is it not a fact that a wooden, standard, tin-covered door such as is standard with the Associated Factory Mutual Fire Insurance Cos. resists fire very much longer than a steel or iron door?

Capt. PHINNEY. By far. We have nothing that will compare with it, as this gentleman has said, in our experience, nothing at all, and we do not accept steel doors.

The SECRETARY. In other words, this standard fire door you would accept and do accept while you would not accept a steel door.

Capt. PHINNEY. We accept it even in the center of a fire cut-off wall. We know that fire will not pass through that opening if it is

well equipped with a standard fire door, and especially if there are two doors, one on each side of the opening, which we always require where values are large.

We have had some little unfortunate experiences with the rolling steel door. We were rather captivated with that at first, but recent occurrences have shown that we can not place too much dependence on it when the exposure is very severe. The tin-covered fire door is clumsy, not very heavy, but there is nothing we know of at present that will equal it.

The SECRETARY. It has been tested out in very many cases.

Capt. PHINNEY. Yes, a great many years.

The SECRETARY. I remember my own experience of having a heavy brick wall between two factories and you allowed me to cut a hole in it. The door was very inexpensive to maintain, as I recall it, but quite thick.

Capt. PHINNEY. Yes.

The SECRETARY. Mr. Gillette, I have not called upon any one of our Department friends before to-day so I would like now to have your views. Mr. Gillette is Superintendent of Naval Construction of the Bureau of Lighthouses.

**STATEMENT OF MR. E. C. GILLETTE, SUPERINTENDENT OF NAVAL CONSTRUCTION, BUREAU OF LIGHTHOUSES, WASHINGTON, D. C.**

I do not know that I have very much to say in this matter. My experience in our Bureau is not along the passenger line, as you know; but in lightship and tender construction we have made a considerable effort to provide against fires. At the present time we have one or two vessels under construction where we are using sheet steel for interior bulkheads with very good success, although their weight is in excess of what they would be in wood. In one light vessel we are using an inside ceiling for protection against sweating, a protected metal, sample of which is in the Secretary's hands, which is a galvanized-iron sheet covered with asbestos on each side. I believed that would answer the purpose intended and take paint a little better. It is deemed better not to have bare metal exposed in the living quarters. In one of our vessels building on the west coast we are putting in steel bulkheads throughout, as the crew will not be very large and as we shall carry inflammable cargoes such as gas tanks, cases of oil, etc., and the vessel also will burn oil under its boilers for fuel.

The SECRETARY. How high do the bulkheads come?

Mr. GILLETTE. Above the main deck. Except in the living quarters the bulkheads are all of heavy steel, three-sixteenths inch plate. In the living quarters it is of lighter construction, stiffened with plate pilasters, angles, etc.

The SECRETARY. Are there any wooden houses on the vessel?

Mr. GILLETTE. No, sir; the only wood on the vessel is the upper deck and the tops of the houses. We thought best to put wood in these places on account of the heat. In exposed places where the sun is hot a steel deck is almost unbearable—in the case of turtle-back vessels in the South it is the same—it is almost unbearable to live in, and for that reason we put on a wooden deck and paint it well.

The SECRETARY. You designed the new Coast Survey steamer *Surveyor*, now building. What did you do on that?

Mr. GILLETTE. I assisted in the design of this vessel. On that vessel there is no sprinkler system. They rely on the fire pump and mains and steam-smothering system throughout the vessel. It has steel main and lower decks and the upper deck is of wood. The vessel is of a modern type of construction.

The SECRETARY. But the construction of the new *Cedar* you spoke of was exceptional because of the inflammable nature of the cargo she carried.

Mr. GILLETTE. Yes; it is for use in charging gas buoys, carrying gas buoys, gas tanks, oil, etc., and supplies for the Lighthouse Service. There might be a possibility of a severe fire on this vessel and we wanted to be able to cope with it to the best advantage, under all occasions, and was so considered in the preparation of the design.

The SECRETARY. Do you regard that as substantially fireproof?

Mr. GILLETTE. Not absolutely, but better than other vessels of this Service. I think some of the gentlemen brought out this morning that the personal equation is one of the most important things in the matter of fire on shipboard. A well-disciplined crew properly stationed and trained by actual tests and drills held at regular intervals is one of the most important things in the whole matter. We, of course, hold fire and boat drills at intervals of one month at least, in the Lighthouse Service, which is, I believe, in accordance with the practice of the Navy, and I think also of other departments. So if the men are properly stationed, each man has his own particular duty to perform and knows what to do.

The SECRETARY. Thank you very much.

The SECRETARY. Capt. McGray, what have you to say to us?

**STATEMENT OF CAPT. ARTHUR N. McGRAY, REPRESENTATIVE  
OF NEPTUNE ASSOCIATION, NEW YORK CITY.**

Mr. Secretary. My attention was called, I think, by the first speaker this morning, Mr. Taylor, when he was describing the Hudson River passenger boats, to steamers in general as floating hotels. I was impressed at once by the fact that he only told a small part of the story. The bulk of the great passenger-carrying ship of to-day, without any question, is a floating warehouse filled with all kinds of material upon which is superimposed a hotel—three, four, or five stories of warehouse and then two, three, or four stories of hotel accommodation—which makes considerable of a large problem to deal with. Of course, that is extreme; that is the limit.

And so, Mr. Secretary, when I received your much-appreciated invitation to attend this hearing I thought it might be a good plan to see what some other people had found out about fires on shipboard and what relation they have to fires on shore, which naturally have received a good deal more attention from scientific authorities on account of the greater number of them than has been the case on shipboard. I thought I would look into that somewhat and see, in the limited time at my disposal, how much I could learn that might bear upon this point. As I can perhaps read better than I can speak offhand, with your permission I will read what I have got together.

(Reading.)

Secretary Redfield's letter, asking me to be present at this time, stated that the primary purpose of the meeting was to consider the whole subject of making passenger vessels more secure from destruction by fire. I do not understand that the discussion is to be limited to those passenger vessels which carry no freight at all, and I certainly hope such is not the case, because it seems to me, as a ship-master who has had experience with the matter of fighting fires afloat, that it is among that great class of combination passenger and cargo steamers that the danger is greatest and where fire protection is most needed.

Most passenger vessels, as a matter of fact, are also freight carriers to a greater or lesser degree, except in the case of purely excursion steamers, and it would seem that any protection against fire devised for a combination of freight and passenger boat would also be the best kind of protection for the purely passenger vessel.

I well remember a number of fires in the bulk sulphur cargoes of the steamers *Herman*, *Frasch*, and *Frieda* during my command of those ships. Theoretically, the best means of extinguishing a sulphur fire is for a shovel brigade to heap on more sulphur and smother the fire. This plan, however, works poorly in practice, as it is impossible to know exactly what is happening underneath, and the confinement of the gases, which generate very rapidly when sulphur begins to fuse, presents an explosive menace which it were well to avoid. I have used steam jets from the standard fire-smothering equipment of the ship on several occasions, but to little or no purpose. The liberal use of water has been the only adequate answer I have discovered so far, but on two occasions this involved entering a hold filled with strong sulphurous fumes in order to direct the hose effectively. The risk to be incurred appeared greater than I felt justified in ordering officers or crew to accept, so the only road open was to personally handle both hose and nozzle. I was impressed at this time with the fact that it was not my boat itself which was burning or which was in imminent danger, but that it was the cargo within that boat.

In looking into this matter, I have been strongly impressed with the fact that it is the cargo or the contents of a boat that deserves the chief consideration. In his book, *Fire and Fire Fighters*, former Chief Kenlon, of New York, presents in a striking way the nature of steamer cargoes, by giving the following description of freight on a New York pier:

Fill these sheds with every sort of combustible material imaginable—hogsheads of rosin, bales of cotton, crated furniture, barrels of pitch, stacks of dry goods, and such unconsidered trifles as a few boxes of celluloid toys and novelties—and can the mind of man conceive a collection of heterogeneous merchandise more calculated to provide the wherewithal for a conflagration and matter to assuage the thirsty pens of all the newspaper reporters in the town?

All of this material was simply the cargo of boats which had not yet been loaded. To a greater or lesser degree, many of our passenger-carrying ships have cargoes of a similar nature, and I am of the opinion that such cargoes as a whole are in the last analysis as dangerous as the most dangerous part of them. I think I am right in saying that the insurance people in making a rate on a building on shore would select as a part of that rate the most haz-

ardous occupancy in the building. I am also further impressed that only by a full consideration of the expert findings of fire insurance experts and architectural designers on land can we best inform ourselves as to the most practicable and efficient manner of successfully dealing with fire-prevention problems on shipboard.

The result of a fire on board ship is so well known that it would hardly seem necessary to dwell on the frightfulness of such an occurrence, but in Chief Kenlon's book there is an account of the burning of the steamship *Saale*, which it seems to me is worth repeating, in order that we may have this picture clearly before us:

The *Saale*, in the very heart of the flames, was cast loose and drifted slowly into the stream, a menace to shipping and a veritable funeral pyre to those on board. Hundreds of desperate creatures jumped overboard and were picked up by passing boats; but hundreds of others were less lucky and were roasted to death in the depths of that floating inferno. Little could be seen of their plight, but as fire boats surrounded the smoking hull, faint cries from the lower ports attracted attention. Suddenly a naked arm shot out through the murk, and a voice cracked with terror screamed for help. Rescuers placed a hose line in the grasp of the quivering hand, and as the water brought temporary relief, the crazed sufferer was understood to say that with him were forty-odd men and women awaiting their doom. A desperate effort was made to haul him through the port, but his shoulders prevented his escape, and even as he was making one supreme effort to dodge death, a wisp of flame shot wickedly out from behind him and branded him with its fiery tongue. With a shriek of demoniacal laughter, he surrendered himself to his agony, and fell back—to be seen no more.

We are here to devise ways and means for preventing the recurrence of such harrowing scenes as Chief Kenlon has described. The boat he mentions was burning thus fiercely primarily because her contents were inflammable. But boats can not pick and choose their freight cargoes.

In addition to these fire dangers in the contents of a boat, we must remember that the living quarters of such vessels also have fire dangers of their own, which are most comparable, perhaps, to the hazards of a hotel on shore. We should therefore bear in mind that fires in hotels are of very frequent occurrence. For instance, on the first day of 1913, five hotels were destroyed, with a loss of two lives and \$100,000. The total amount of fires in such properties during the month of January of that year was \$700,000. In fact, it is estimated that during the last five years fire losses in hotels in the United States and Canada have been \$25,000,000—on the average, one hotel burning up every 33 hours. (These figures are from Chief Kenlon's book, pp. 170-171.)

A boat is happily removed, except when in port, from the danger of spreading fires such as a building is subject to, and this is another reason why it seems to me that what we should chiefly be interested in is the means of guarding against fires which start in the contents of our ships. I believe it is well known that the values on land and the losses on land by fire are chiefly in the contents of buildings. In the *Spectator Year Book* for 1914 may be found the following figures:

| Year.     | Insurance<br>in force. | Loss, build-<br>ing. | Loss, con-<br>tents. |
|-----------|------------------------|----------------------|----------------------|
| 1912..... | \$100                  | \$1.48               | \$17.17              |
| 1913..... | 100                    | 1.00                 | 8.93                 |

This, of course, represents millions of dollars of fires reduced to a \$100 unit for the sake of comparison.

I am prompted to go further into this matter of the danger of contents, because I noted in the Secretary's report several references to fireproof construction. As a former shipmaster, I am deeply interested in how it is possible to escape this danger of serious fires in cargoes by means of any change in the construction of vessels.

Chief Kenlon's book and this reference to fireproof construction set me to looking into the matter of contents and fireproof construction. I am not an engineer, and the points I shall raise are merely statements of men who have studied the subject. I raise them in an effort to get information and to encourage full discussion. For instance, the late H. C. Moore, prominent insurance statistician and rate maker, who I believe was chiefly responsible for the present method of making insurance rates, says of fireproof construction:

The fireproof structure, as already stated, holds its merchandise and other contents suspended where they will be the more effectually destroyed.

A further reason why the contents of fireproof buildings are so thoroughly destroyed when once ignited, is that the fireproof construction, like a reverberating furnace or oven, confines the heat until extremely high temperatures are reached. The principal advantage after all, therefore, of a fireproof building is the separation of the various stories from each other; and this may be largely, if not entirely lost, if the building has well holes, like the Horne Building, or if staircases and elevators are not cut off in fireproof hallways. Architects usually overlook the fact that iron may so expand under heat as to thrust out the side walls of a building; if, indeed, iron columns do not collapse under their weakened capacity to resist strains, due to high temperature. It is a fact that wooden columns, especially of oak, 12 inches square, would stand an enormously high temperature without having their carrying capacity interfered with, fire only burning to the depth of, say, 2 inches.

Indeed, it is important that iron should be protected by fireproof materials wherever used.

How on shipboard are we to even fireproof the steel or iron parts of a boat, as pointed out in the last paragraph above. More important, how can we expect such construction as is possible of being designed for ships to protect the contents of those ships? I believe that the fire underwriters maintain that each floor of a building must be cut off from every other floor by fireproof material; that the windows of such structures must be of wire glass with metal frames, if the building is to be thoroughly fireproof. How do we propose to cut off the decks of a ship? How do we propose to stop fires from spreading from one stateroom to another through the windows? Would an insurance rater regard the ventilating methods employed on most ships in the same way that he would regard openings from floor to floor in a building? J. K. Freitag, in his book, *Fire Prevention and Fire Protection*, says:

As a matter of fact, it will be found that the type of construction will make little difference in insurance costs, for the following reasons:

- (1) The value of contents is usually far greater than the value of building.
- (2) The value and character of contents, rather than the type of construction, will usually determine the amount of fire protection necessary.
- (3) Any possible saving in insurance rates which might be effected by the use of concrete construction would be very small as compared with the total, for the reason that practically all fire losses to-day in mills or factories of standard construction are confined to contents, and insurance rates are made accordingly.

Fire protection, viewed in its broad and proper light, should include not only the *passive* qualities of fire resistance in design and construction, but also those *active* means of fire detection and fire-fighting appliances which go so far to supplement and make effective the purely passive elements of the problem. Fire protection should be aggressive as well as purely resistant.



Fire protection concerns not only the building but its contents as well. Damage to contents is not eliminated by simply providing an incombustible structure for their receipt. Many a fire has spread rapidly and spread through a building with ultimate heavy loss in stock or contents but with comparatively little damage to the structure itself.

A speaker before the Structural Section Engineers Society of Western Pennsylvania made this comment on the subject:

A competent architect in his city figured out that the ordinary office building about 100 feet front, 150 feet deep, and 12 stories high contains, in the form of mixed combustible material, comprising floors, moldings, door and window frames, partitions, stairs, stair rails, and similar structural parts, enough combustible materials to run the *Mauretania* 24 hours, which I recall burns 1,200 to 1,300 tons of coal during that period. The older type of fireproof office buildings will probably contain 50 per cent more combustible material. If we add to the combustible portions of the building the combustible contents, ranging from a few chairs and desks to a dry goods store stock, we have wonderful heat-producing possibilities.

As has been pointed out, a good-sized fire will produce temperatures of from 1,800° to 2,000° F., and a fire which has a particularly large amount of material to feed it, and good draft conditions, will develop temperatures up to 2,200°. Some fires are authentically known to have gone higher than that. When we consider that concrete begins to dehydrate at 500°, and that steel beyond 1,000° to 1,200° loses its strength rapidly, and at about 1,700° is incapable of sustaining its own weight, it is seen that a temperature around 2,000° can do tremendous damage to an improperly designed or built fireproof building.

The furnace is fireproof exactly the same as a building is fireproof, but the contents of each will burn fiercely just the same and oftentimes produce many million dollars loss and untold lives to be sacrificed.

In view of the existence on our boats of burnable material in the shape of contents, and in view of the statements I have quoted from underwriters showing the inability of structural material to take care of fires originating in such burnable material, it seems to me that we must look further for the solution of our problem than to any changes in construction alone, valuable as they may be. More especially is this so since we can not possibly think of reconstructing boats already in existence, even if we felt that such reconstruction would solve the difficulty. The boats are built; they are running; they are carrying priceless cargoes of human lives above burnable cargoes of merchandise; many of them are themselves inflammable. What is to be done with these boats? In fact, what is to be done about the contents of boats built in future, even if 5 per cent to 10 per cent is added to their cost to provide the best fireproof construction? Will this construction remove danger in proportion to its added cost, or is some other method better and more economical? To me, it seems clear that we should attack this problem in the same way that it has been attacked by large manufacturers and merchants on land. They have found that the only way to make the contents of a building safe is to install a system of automatic sprinklers.

I believe most of the gentlemen present are familiar with the Factory Mutual Insurance Cos., and know that the most hazardous risks in the United States are comprised in the membership of those organizations. Their buildings, for the most part, are not fireproof, but are made of brick and wood. Here we find cotton mills, woolen mills, shoe factories, paper mills, metal-working plants, that have reduced their fire losses through automatic sprinklers to less than 5 cents per \$100 of insurance.

The reports of these companies are available to anyone wishing to see them, and I have had a chance to see statements from the officials of these companies as regards the possibility of applying auto-

matic sprinkler protection to ships. Practically all of them agree that the device could and should be a part of steamboat equipment.

I believe the general efficiency of automatic sprinklers in buildings is unquestioned; but I doubt if most men know that since 1897 more than 17,000 fires have been reported to the insurance companies where sprinklers were effective. This probably does not include thousands of fires where the loss was so small as not to be reported. These fires occurred for the most part in extremely dangerous plants with large unbroken areas. Is it not logical to suppose that on a ship, with its many small compartments, the record would be even more remarkable?

The National Fire Protection Association of Boston publishes tables on these sprinkler fires. The tables for April, 1916, show that over 31 per cent of all the 17,000 fires are put out by one sprinkler head, one head covering as a rule a square 8 by 10 feet. Seventy per cent of the fires are put out by five or less heads. Taking into account the kind of property protected, this seems to me a wonderful record, and one which we can not afford to overlook in dealing with vessels. Such protection stops fires in contents or buildings either. That seems to me the big point—sprinklers *will stop* fires starting in freight cargoes.

In addition, the sprinkler gives a fire alarm when it starts to work, and it works without human aid. I have seen several boats equipped with sprinklers, but I believe some of those equipments are not entirely automatic, which is too bad, because the chief virtue of sprinklers on land is that they are always ready to begin work without human aid.

The following is a list of the steamers either wholly or partially protected by sprinklers, and I should like information as to the reasons why shipowners have not more largely made use of this apparatus:

PARTIAL LIST OF STEAMERS EQUIPPED WITH SPRINKLERS.

*Alabama* (runs between Chicago and western Michigan ports).  
*Bee & See* (partial).  
*Bunker Hill* (Metropolitan Steamship Line).  
*City of Cleveland* (partial).  
*Commonwealth* (N. E. Navigation Co.).  
*Casandra* (steam yacht—New London, Conn.).  
*Detroit the Third* (Detroit & Cleveland Navigation Co.).  
*Fort Sutton* (San Francisco, Cal.).  
*Massachusetts* (Metropolitan Steamship Line).  
*No. 1290* (of the Fall River Line, N. E. Navigation Co.).  
*Pequannock* (freight boat, N. E. Navigation Co.).  
*Plymouth* (N. E. Navigation Co.).  
*Western States* (Cleveland & Buffalo Steamship Co.).  
*Indiana* (Goodrich Transit Co.).  
*Imperator* (Hamburg-American Line, Mather & Platt equipment).  
*Vaterland* (Hamburg-American Line, Mather & Platt equipment).

It has been my personal good fortune to have visited or to have sailed on most of these ships. I have made it a point to question the officers as to their opinion of the sprinkler system, and with such uniform good report that it has been a matter of satisfaction to note the approval on April 8, 1916, of the changes in Rule IX, Ocean and Coastwise; Rule XI of Lakes, Bays, and Sounds; and Rule XI of Rivers, General Rules and Regulations of the Steamboat Inspection Service.

In my opinion, the best and most practical method of fire prevention on shipboard, and that involving the minimum of cost, is to be found in—

- (a) Extending all water-tight bulkheads to the upper deck.
- (b) Isolating each deck whenever practicable from the others by means of water-tight steel hatches.
- (c) The installation of an automatic sprinkler system throughout the ship.
- (d) Metal doors, furniture, and partitions in passenger accommodations.

Passenger ships of the excursion type do not lend themselves to this entire combination plan, but that they should be provided with an equipment as full as practicable along these lines is without question a long step in the direction of prevention of their destruction by fire.

The SECRETARY. Does anybody present desire to ask Capt. McGray any questions?

Mr. Dobson, you represent a very well-known concern, the William Cramp & Son Ship & Engine Building Co. I shall be glad to have your views.

**STATEMENT OF MR. WILLIAM A. DOBSON, NAVAL ARCHITECT, THE WILLIAM CRAMP & SON SHIP & ENGINE BUILDING CO., PHILADELPHIA, PA.**

Mr. Secretary and gentlemen, as has already been referred to this morning by Mr. Gatewood and Mr. Magoun, the shipbuilder stands ready to devote all his energies and resources to meeting the requirements of the shipowner, provided these requirements are within the limits of possibility and that the owner is willing to meet the cost involved. There is a great deal that has already been done in retarding the spread of fire in ships. It has been our fortune at our shipyard to build one of the vessels referred to this morning, the *Commonwealth*, where we have seen the sprinkler system installed, the fitting of screen bulkheads with fire doors, and the cargo spaces sheathed with steel. I believe the principles there worked out are the principles on which present or future fire-retarding work must be developed as applied to passenger vessels. Of course, this was some years ago, and since then we have had the advantage of advances and development in types of material, such as composite board, which can now be made fireproof. We have also a very good material in asbestos board, which is fireproof, and does not conduct sound as does the all-steel structure. Besides, it is more pleasant to the touch than steel.

The SECRETARY. Excuse me. Is any of that board made on wire, as wire glass is made?

Mr. DOBSON. I have not seen any of it so made. I have seen it made so strong and stiff that it stands like ordinary lumber. It is sometimes used for outside sheathing, but it is heavy; and if the shipowner wants to have a ship nearly fireproof, he must put up with such disadvantages as increase in weight and cost. On a passenger steamer of the Sound or river type, when draft is absolutely limited, it is impossible to carry so much heavy material in her construction; but I believe a great deal can be done by development along the lines of the installations which have already been made in these vessels referred to. The cost, of course, is a matter which concerns the

shipowner, and sometimes the cost of introducing certain improvements would be so great that a boat could not be built and operated at a profit. All these things must be given due consideration; but I wish to assure any of the shipowners that the shipbuilder stands ready at all times to cooperate with them and to give them the very best service possible. Of course when we undertake a problem where something novel and outside the known art is required, we naturally go for advice to specialists in the particular line of the work desired. Perhaps it might be in ventilation; it might be fireproof doors, or fireproof construction. We very gladly avail ourselves in such cases of the advice and services of the experts who make a specialty of such lines of business.

The SECRETARY. Is Capt. Blair in the room? We have not heard anybody as yet from the Mississippi River district. Capt. Blair is general manager of the Northern Steamboat Co., Davenport, Iowa.

**STATEMENT OF CAPT. W. A. BLAIR, GENERAL MANAGER, NORTHERN STEAMBOAT CO., DAVENPORT, IOWA.**

Mr. Secretary, I happen to be the only one connected with our St. Louis association of boat owners able to get away. This is our busy time. And I came in very much of a hurry and had very little idea of the import of this meeting; but I am glad I came. It opens up to me what I think is a school of instruction. We have much to learn. I have rather been impressed a few times in my life that steamboat men think they know it all. It is very evident to me that we have not learned all our lessons yet, and I hope through this committee, which I conclude will be selected to-day, that we will get a lot of valuable information which will do us good in coming years. We want the right thing, and we have all had enough actual experience in life to know that the right thing is the cheapest thing in the long run.

Our type of steamboat—the western—has had a bad name from long years ago; and then when Mr. Hay finished it off with that poem about Jim Bledsoe, "She Has Had Her Nose Agin' the Bank" chasing us ashore ever since "the Night of the Prairie Bell," no matter how the conditions may have changed, we have had to fight that old reputation, and people while coming aboard in fear and trembling hope that they will get there all in one chunk, neither burnt nor drowned. This feeling is not borne out by the facts, I am happy to say, because the situation has changed.

There were a good many boats burned in the years when the cargoes were nearly all highly inflammable material. That was in the busy days, in the palmy days we read about, when there was so much racing, a time when stories were written which nearly always wound up with a fire, or a race in which there were two explosions at least. I have seen some racing in my time. I have yet to learn of a boat that blew up in a race. I have been 36 years in the business, actively engaged, and I have never seen but one trifling accident. The Diamond Jo Line, which operated many boats on the Mississippi River for 35 years, never had a loss by fire. The Streckfus Line, which bought out the Diamond Jo Line, has been operating for several years, and under their management they have not had a fire. They never had but one fire, and that was a very peculiar one. It was an

excursion boat filled with people. It caught fire in the hold and they could not turn on the steam to put out the fire without cooking the man in the hold who started the fire. They landed the boat without loss or injury except to one hysterical woman who jumped over on the deep side.

The Eagle Packet Co. has been in successful operation for many years. They never lost a boat by fire, except one, which caught fire from another boat at the wharf at St. Louis. The greater proportion of the fires that have occurred during my time have been on boats tied up at the bank. Of vessels burned, for some strange reason, the fatality seems to have been greatest among those that had not been doing well and had a poor future. I would not charge those men with arson. We know where an individual is not doing much business, is out of money (they are a plucky lot and will hang on as long as they have money and the public has confidence in them), he becomes careless, and the boat burns. That is the history of most of our fires. Among those who are active, those who are doing anything like a prosperous business and can stay in the game, the fire losses have been so small and infrequent that we have not really thought anything about it.

But there is another reason for that, the improvement in the inspection service. Mention has not been made of this, I believe. In this same connection, years ago when the fire losses occurred on the western rivers, many of the things we have now we did not have then; inspections were infrequent and they were not severe. It is more trouble and it takes more time to inspect the hose now than the entire job took when I commenced. There never was any expectation of trying the pumps or inspecting the hose.

The SECRETARY. Did they overhaul the rudder chains when they inspected the vessels, Capt. Blair?

Capt. BLAIR. No; inspections were very lenient. They became gradually more rigid and careful. We had no fire pumps in those days at all. They had hand pumps that would not throw. Now they have steam pumps and hand pumps in addition. I find it a great convenience to have that pump there all the time, a convenience supplying water all over the boat.

We realized that in practice when a fire starts it would probably be in the cargo. Not only by our regular inspections but by our frequent inspections now our boats are kept pretty near the scratch. We prevent fire from taking place in the first instance by protecting the woodwork exposed to the heat, around the chimneys, in the kitchen, and the galleys. The oil lockers are all cared for. Those things are looked after. Besides the frequent inspections are the weekly fire drills. I thought when that was ordered in the first place it was putting it to us pretty strong, but I tell you I am an enthusiastic convert to it. I do not know of any one thing that has added so much to our safety as the fire drill. I am as much an enthusiast on that subject as the men who first suggested it.

Fire Chief Croker spoke of one thing that I understand. He went out to sea with that man and he spoke of the condition those fellows were in. We all have that to contend with, and this is where the fire drill comes in right. Just as soon as they are straightened up, the first day you leave port, when they know what you are talking about, we give all hands a good drill. I am surprised at the interest

they take in it. I am highly gratified with it. I am so pleased with it all that I was not at all surprised when this new regulation about the sprinkler system reached me just the day before I started, because I think it will mean the cure of the only real danger we have left, that of the fire starting in the cargo. It will take care of that very nicely and it can be done without having a very material effect on our draft. We can not stand much increase in draft. Our steamboats between St. Louis and St. Paul draw  $3\frac{1}{2}$  feet. During 1910, which was a favorable, warm summer, when everybody wanted to go, we did not have a boat that was able to go to St. Paul. We had their officers hired and we had to pay them, masters, engineers, pilots, mates, and pursers, and you can imagine how much that idle summer put us in the hole. The following season, 1911, one of our boats, the *Quincy*, did not get there at all. One of the others got through all but two trips. She sank once and lost a little time. Fortunately, there was not enough water in the river to sink very bad. We did not have to send for a diver. Every weight that we put on the boat in the water increases her depth. Our danger lies in the bottom. If the mates will keep her off the bottom and the pilots off the banks we are all right.

The SECRETARY. We did not know we were to have a humorist with us to-day.

Capt. BLAIR. I am talking things over because we *have* these troubles. The fire risk has been so slight and the sinking and trouble from snags are so frequent that we are looking down below there for trouble rather than anywhere else. But we do feel that this matter of fire does affect us no matter where it occurs because if an accident occurs anywhere it is in our papers the next morning and we get punished along with the rest of the business. I have always been so glad that at the dawn of history, the start of navigation, the earliest navigator, our esteemed ancestor, Capt. Noah, did not set his boat on fire and sell out to the insurance companies.

The SECRETARY. Is Mr. LaDow in the room?

Mr. LaDow. Yes, sir.

The SECRETARY. Mr. LaDow, I think you can tell us something about the furniture risk in this matter.

**STATEMENT OF MR. ROBERT V. LaDOW, OF THE DAHLSTROM METALLIC DOOR CO. (OF JAMESTOWN, N. Y.), WASHINGTON, D. C.**

Mr. Secretary, I have nothing to do with furniture. Our company manufactures hollow metal doors and trim. I think there is a gentleman here who represents a metal-furniture company.

The SECRETARY. We will give him a chance next. If you have anything to tell us about doors, let us hear it.

Mr. LaDow. Hollow metal doors were placed on the market only after metal-covered doors had been given a thorough test and failed of their purpose. It had been the experience not only that the metal-covered doors did not furnish adequate protection in case of fire, but also that in many places they were not refined enough for use; while on the other hand, Dahlstrom hollow metal doors have withstood several severe fire tests in buildings in which they have been installed. In no instance have the Dahlstrom doors failed to confine the fire to

the room in which it started. In appearance they have no superior in any material. They were, of course, designed in the first place to be used in buildings, but soon found use in railroad cars, and not only this Government but also England has recognized their worth for use in shipbuilding as well. Our doors were used extensively in the English ships *Acquitania*, *Laconia*, and *Carmania*, and it is safe to assume that their use will be gradually extended to all of the better class of passenger ships of English registry. It is plainly evident that fire is a greater menace on sea than on land, and for that reason every safeguard should be furnished against this danger.

The SECRETARY. Have you furnished them to the Navy?

Mr. LADOW. Yes, sir; some of the battleships that are completely or in part equipped with our work, are the *Utah*, *Florida*, *Texas*, *New York*, *Nevada*, *Oklahoma*, and possibly others I can not name now. We have also installed work in some of the torpedo boats for the Navy. We furnished the metal joiner work now being installed in two lightships at Wilmington for the Lighthouse Service. At the present time we have the contract for furnishing the hollow metal joiner doors for the battleship *Mississippi*. In addition to the doors furnished for the United States Navy we also equipped the Argentine battleships *Moreno* and *Rivadavia* throughout (now, we understand, acquired by Japan) with metal joiner doors and frames. I think Mr. Bennett, of the Fore River Co., could say something about the installation of our work in ships built by his company for the Navy.

Mr. BENNETT. I should say that they were specified by the Navy Department, and we were forced to put them in.

Mr. LADOW. The Navy Department has specified hollow metal doors for battleships after devoting much study to the best methods of construction and equipment, not only against accidental fires, but also to lessen the liability of flying wood splinters in times of action, and this careful study has resulted in the adoption of those features which are now considered as standard in battleship construction. This indorsement by the Navy Department should be considered as sufficient reason for adopting them in the construction of ships for passenger service. Not only is this method of construction adaptable for doors and frames but also for partitions, berths, and other equipment as well; while the tin-clad wood doors are unsightly, and subject to the strain of contraction and expansion of the wood caused by atmospheric changes.

In regard to hollow metal doors a word of caution may not be out of place here as there are good, bad, and indifferent workmanship in all lines and there is no exception in the hollow-metal industry; but the Dahlstrom Metallic Door Co.'s products stand to-day, and I hope always will stand, as an example of the best that can be produced.

The SECRETARY. Mr. Ackerson, will you tell us about this subject?

Mr. ACKERSON. In battleships we do not have wooden doors; whether we specify the Dahlstrom I very much doubt. We require steel doors.

The SECRETARY. Tell us very frankly what you can about this whole question of protection.

**STATEMENT OF MR. JAMES L. ACKERSON, NAVAL CONSTRUCTOR,  
NAVY DEPARTMENT, WASHINGTON, D. C.**

Mr. Secretary and gentlemen, we do all that has been suggested except to install automatic sprinklers. We have no automatic sprinklers and it is possibly because we are not sufficiently familiar with their merits. We are investigating them. We depend possibly more upon inflammability of material used and in the inspection of the vessel while in service than we do upon the actual fire-fighting facilities. We have the usual water systems. We have carbon dioxide systems for storerooms adjacent to fuel-oil compartments. We have foam fire extinguishing for fire rooms, paint rooms, and various spaces in which there may be fuel-oil fires. We exercise the greatest care in all electric installations throughout the ship, particularly in spaces in which ammunition is stowed or handled. Otherwise we make no special endeavor to keep away from fire troubles.

The SECRETARY. Except by building a ship that will not burn?

Mr. ACKERSON. Right. We do not have to contend with passengers, of course, to the extent that passenger-carrying lines do; nor do we have the inflammable cargo to contend with, except ammunition, and that of course is in hermetically sealed spaces. It is inspected daily, sometimes two or three times a day, and in some ships it is automatically refrigerated. I do not think the conditions on board ships in the Navy have much in common with merchant vessels.

The SECRETARY. Thank you very much.

Mr. Furuseth, you have been sitting here very patiently all day long.

**STATEMENT OF MR. ANDREW FURUSETH, PRESIDENT OF THE  
SEAMEN'S UNION, SAN FRANCISCO, CAL.**

Mr. Secretary, I have been very much interested in listening to the talk on material and the means to avoid fire. Three or four of the speakers have mentioned another phase of it that I know more about than I do about the other means. I think that Capt. McGray gave the real facts when he said that it is the cargo that burns more than the vessel. I have been in three or four fires on shipboard myself, and it was always the cargo. I know that what saved us in the cases in which I was involved was the fact that we had on board a sufficient number—that is, a reasonable number—of skilled men who knew just what to do and who were able and had the courage to obey the orders that were issued. I had one particularly interesting experience with a fire on a vessel going from San Francisco to Nushagak, Alaska. We had about 250 people aboard, all fishermen and Chinese, who were going up there for the purpose of putting up salmon. The hold of the vessel was full of inflammable stuff, and some of it would ignite of its own accord by rubbing against each other. We had a lot of acids on board, and those we had on deck, in big drums. That is the usual cargo of salmon fishermen. Coming near our destination in the Bering Sea we found smoke coming from the hold. It was bad weather. We opened up the hatches and dug ourselves through until we got to the fire and then extinguished it. We had a big crew on the vessel just at that time, fishermen, of course, and they



are all seamen—they were in that case anyway. We could have done it with the ordinary crew also.

The best kind of implements to prevent fire are none too good, but there is no way to prevent it altogether. The best way of building a vessel so that it will withstand fire is none too good, but a fireproof vessel does not exist, and I do not suppose she ever will be built. If she could be built, the man-of-war would be of that kind. There are not any of them that would not burn after all in some way or another.

The next proposition is to have somebody on board the vessel that can handle the fire apparatus when the fire begins; first to catch it in its first and early stages, and in order to do that there must be a sufficient number of men on deck all the time—on watch, so as to keep the vessel under constant inspection, as you call it here. If you do that, you will discover the fire pretty nearly as quickly as the automatic sprinkler system will; not if it is in the hold, of course; in the cargo you will not, but anywhere else you will.

The next proposition is that when you have the knowledge that there is a fire is to have the men that know how to go to work and extinguish it. For that purpose men are needed who have the skill and the courage—skill to do things that are necessary to be done, and courage to do it at their own risk. Now, of course, that is manifestly impossible in some of our vessels, a large number of our vessels, not on the rivers nor to a very large extent on the bays, but on the ocean and coastwise. We have a condition in which a large part of the men have no conception of what the captain or the engineer says to them in case of an emergency. That is probably one of the most important things to consider with reference to the human element referred to here by Mr. Taylor, I think.

With the best kind of appliances that you have applied to the new vessels, after thorough investigation as to what is the practical thing to do with the new vessel, the next proposition is what about the old. If they are permitted to go, they will have a great advantage over the new vessels, because the public as a general proposition does not know which vessel is good and which vessel is bad. The people see that inspection certificate—if they see anything at all they see that—and they say, "Uncle Sam takes care of that," and take chances accordingly. Those vessels which are poorly equipped and poorly manned give the reputation to those which are well equipped and well manned, and endangers all of them. And those are the people that are most important to deal with. Wherever it is possible to make the old vessels fit or put in the things on the old vessel or change the old vessel to correspond with the new vessel, in the interest both of the good vessel and of the traveling public, that ought to be done.

Now there is one more thought that I want to call to your attention. Where there is a fire on board a vessel there are two things that are especially necessary if you could have it done. One is to have a system of call from the bridge to the crew's quarters. One-half of the crew being on deck, some of them, if it is a small boat, will have to go to call those who are below. You can spare nobody. It takes up some time, and if there were a system of calls from the bridge to the crew's quarters so that you could arouse the crew without arousing anybody else it would be a great good. More than one-half

of the fires that occur on board the vessel are never known to the passengers. We never let them know anything about it, nor is it reported to the inspectors when the vessel comes in. No serious harm being done, why make a fuss?

There is another call bell that ought to be on board passenger vessels. There should be some system by which the officer on the bridge can call every stateroom where the passengers are; that is, press a button and make enough of a noise to get the people who are in there to come out when it is really necessary that they should come out. That applies with equal force to a collision and to a fire. Outside of that I do not see what else you can do except take the chances. We have always taken them.

In conclusion I would say this, that there is very much in the statement of the gentleman from Iowa that vessels that are not making very much money somehow or other are more subject to fire than other vessels, particularly if they are fairly well insured. There is not any doubt about that. It went so far in that matter that Joseph Chamberlain said about safety—I think I can quote just about what he said—"the shipowner gets the value of his vessel back, and sometimes more. The owner of the cargo often gets more than the value of the cargo back, and the insurance people make money on the premium." The more fires, the higher the premium and the more money they make. So there is more truth than poetry in that sizing up of the situation. I do not think the men who own ships, Mr. Secretary, are any more immune from temptation than men who own stores. The best insurance against fire is a skilled crew of real seamen. They can put out a fire when there is yet time and they can tell all about it later if there is something mysterious about it. They are likely to have pretty good judgment about causes and this kind of men are not hired when the vessel is to be sold to the insurance.

**THE SECRETARY.** Thank you very much, Mr. Furuseth.

Gentlemen, I have not tried to go by a list. I have tried to give everybody a chance. If there is anyone who desires to make a statement, I shall be very glad to have him do so. (After a pause.) I wish Mr. Newman would make a statement.

**STATEMENT OF MR. T. F. NEWMAN, OF THE C. & B. TRANSIT CO., CLEVELAND, OHIO.**

Mr. Secretary and gentlemen, I have been very much interested in the discussions to-day. I believe that we are on the right track. This committee which I hope will be appointed will find a good field. There is no question about that. And I say that from our standpoint we will cooperate with them in every way.

**THE SECRETARY.** Thank you very much.

**MR. GOODRICH.** I think the call bell from the bridge to the crew's quarters is in the regulations, is it not, Gen. Uhler?

**GEN. UHLER.** Not from the bridge.

**THE SECRETARY.** The vessel on which I was 10 days ago had a fire at 5 minutes past 6 in the morning. There was no call to the crew's quarters and they had to detach a man to send them up.

**STATEMENT OF MR. PAUL G. BROCK, OF THE ART METAL CONSTRUCTION CO., WASHINGTON, D. C.**

Mr. Secretary and gentlemen, nothing has been said of steel furniture. It has been touched on a little and passed over quickly——

The SECRETARY. That is what fire does with it.

Mr. BROCK (continuing). Especially by the owners and shipyard people. It has been criticized. Mr. Taylor, I think, criticized metal furniture as being excessively heavy. Such is not proven by facts. Some years ago we requested the Navy Department's permission to design furniture for battleships. Their first question was, "How much would it weigh?" The wood equivalent of the first experimental piece weighed 150 pounds and our article weighed 495. They immediately said, "That will not do." We started to work, realizing that we had to meet that condition, with the result that we have been able to furnish steel furniture lighter than its equivalent in wood; not only that, but steel furniture that will be so strong as to withstand the vibration of the heavy gunfire. We offer to deal with the naval architects and the shipyards in developing steel superstructures. They will not be obligated in any way if they will accept our offer. We hope you will permit us to confer with this committee if it is organized. We would like to show them how this can be built, how much it will cost, and its weight.

We have the actual knowledge of the fabrication of light sheet steel and of the methods of folding, reinforcing, bending, etc., so as to get the maximum strength out of the minimum weight. Shipbuilders are accustomed to dealing with steel plates and beams. Our business deals entirely with sheets. We know how to handle sheets, and we are willing and only too glad, if given the opportunity to deal with the naval architects and with your committee, to give you an absolutely fireproof superstructure—one that will not burn.

The SECRETARY. Do you feel that you can furnish steel construction which will correspond in weight substantially to wood?

Mr. BROCK. We have done it in furniture, and we feel that we can do it in the housing and partition work. Anyhow, we should like to try it.

The SECRETARY. That is a laudible ambition.

Mr. MYRICK. How much more does your steel furniture cost?

Mr. BROCK. At the present market, I think it is cheaper than wood.

Mr. FURUSETH. Lighter, stronger, and cheaper—that settles it; you will get it.

Mr. BROCK. It has gone through the experimental stage, and now they are buying it very cheaply. We have had the experience, we have the machines, and we have the dies; and we can turn it out cheaper than when in the experimental stage.

The SECRETARY. Mr. Brock, what do you mean to cover under the head of "furniture?" Not merely such furniture as applies to an office, I suppose. You would cover such matters as shelving, cabinets, etc., would you not?

Mr. BROCK. The berths, the drawers, the mess tables, the equipment in the kitchen, the pulpit for the minister (they have a chapel on some of the naval ships, and have a very small folding pulpit for the minister), etc.

The SECRETARY. And shelving?

Mr. BROCK. Yes. Everything, I believe, within the bulkheads, the structural bulkheads. The entire furniture equipment is of steel on the *Cedar*. This ship you must know was designed by the naval architect of the Department of Commerce.

The SECRETARY. Why did you do that, Mr. Gillette?

Mr. GILLETTE. For the sake of cleanliness, mostly.

The SECRETARY. Did you take into account the weight?

Mr. GILLETTE. Yes, sir.

The SECRETARY. How did you find it as to weight?

Mr. GILLETTE. About 20 per cent heavier than wood.

The SECRETARY. You do not know about the price?

Mr. GILLETTE. I do not know.

Mr. BROCK. I am convinced that our prices are less than those of wood. Furthermore, I think in figuring a 20 per cent excess of weight, that is rather large.

The SECRETARY. There are a great many little bolts, clips, etc., which must be taken into account. On one battleship there are 59,000 pounds of wood and 50,000 pounds of steel.

Mr. DOBSON. We built a Russian battleship, also a cruiser for the Russian Government. The cruiser was sunk by the Japanese, and she laid on the bottom for several months. This vessel was fitted with metal furniture. She was raised by the Japanese and added to their navy, the metal furniture made by Mr. Brock's firm being found in excellent condition and not corroded.

Mr. BROCK. One was 18 months under water and the other 22.

Mr. BERRY. It seems to me like a long jump from metal furniture to an entire ship. It is well to consider carefully the statement that a metal structure can be built as light as a wood structure in all cases.

Mr. BROCK. Mr. Chairman, I said we should like to try it.

Mr. BERRY. There is an intermediate step in the steel passenger coach. In that case the weight of the steel coach has in all cases largely exceeded the weight of the old wooden coach, and for that reason I question the statement.

Mr. BROCK. The more weight there is on the rails, the safer the coach.

The SECRETARY. Is not that because they put in a very heavy plate girder the entire length of the car, which does not exist in a wooden coach?

Mr. BERRY. I was considering the bodies only.

Mr. BROCK. That is from the standpoint of safety. A certain railroad president traveled in a car with a 6-inch armor-plate floor, so if his car hit anything else it would go through it. We do not want the naval architect and the shipbuilder to judge us before we are heard.

The SECRETARY. We are all agreed as to that, Mr. Brock. I think this committee can be relied upon to give you a fair hearing.

Have you anything further to say, Mr. Berry?

Mr. BERRY. No; I believe that is all.

Mr. BROCK. The problem of fire protection in connection with public conveyances, as well as the subject of fire protection in buildings, has consumed, during the past few years, the almost undivided attention of architects, engineers, and manufacturers. Railroads have recognized the value of steel in the construction of passenger

coaches, and, at the present time, on nearly all of our principal railroads the ~~old~~-time wooden and very highly combustible coach is fast becoming extinct. The reason for this is that through the use of the steel coach the loss of life has become greatly reduced. Thereby this not only reflects back on the railroad as a very great advertising feature, but also is proving profitable in the elimination of claims for death and disability. In all our large cities ordinances have been passed which make it imperative to construct buildings within certain zones of absolutely noninflammable materials. However fire-proof an office building may be constructed, it avails little if the furnishings and the office appliances, such as filing cabinets, desks, bookcases, etc., are not also made of noninflammable materials. It is quite evident that a fire can not exist where there is nothing to burn. So much has been done to protect life and property on shore that it seems rather deplorable that the question of the same protection on the high seas has so long been overlooked. It is apparent that the reason for avoiding the use of steel as a fire retardant in ship construction is because it has been believed that the weight would be excessive; also that the cost would be prohibitive. I will state that neither of the above suppositions is true, but I hope to explain in detail later.

A few years back it was deemed advisable by the Russian Government to replace the old type of wood "joiner work" with steel. Three ships were therefore equipped with metal furniture, and in those days the problem of weight had not been given the careful study as at the present time, but, nevertheless, it was realized that steel was incombustible; also that the splintering of woodwork when the ship was in action would be eliminated. As a matter of interest, the ships equipped with metal furniture were sunk in action by the Japanese and after being immersed for a period of two years were raised by them and the furniture which was made of steel was found to be completely intact. It had been completely protected by the very fine quality of baked enamel finish which is to-day applied to this product. This shows clearly that steel is not subject to corrosion even though immersed in salt water, if it is properly protected. This fact disproves claims which, without doubt, will be made by those opposed to the use of steel for this purpose because of selfish commercial reasons. Nevertheless, we can guarantee that our process of baked enamel finish has withstood the test of time. All that has been done by our railroads, by our Federal, State, and municipal governments in the passing of ordinances to protect life and property against fire on land is a decided step in the advance of modern civilization.

While much thought has been given the subject of fire protection on board ship, we believe that at the present time little has been done. A ship may be built of steel, it may have steel cross and longitudinal bulkheads, but if the superstructure is largely of wood, the cabin furniture is of wood, the ship is not by any means a fire-resisting structure. With the development of the modern steamship carrying yearly all over the world thousands of souls, the need of fire protection has become imperative.

The construction of a fire-preventive ship is not only theoretically possible, but it is commercially practicable. It can be accomplished

by the substitution of steel for wood in the construction of the superstructure and the furnishings of the public rooms and cabins.

It has been demonstrated that two thin sheets of steel not over 18 gauge in thickness, with an intervening air chamber between and the sheets laterally secured together, is a more effective fire retardant than a one-half inch or even a 1-inch solid plate of steel, because the uneven expansion under high temperature of the two faces of the solid plate forming a bulkhead or partition causes it to buckle and open up at the joints, whereas if the bulkhead be made as above described, the air chamber prevents the sheet on the side away from the fire from becoming superheated, with the result that it remains in place and prevents the spread of fire. The weight is practically the same as if made of wood and the cabin framing or "joiner work" can be produced at only a slight advance over the cost of wooden framing. Double steel cabin partitions may be built with air chambers for resisting fire and constructed so that they can be easily fitted around beams, angles, or channels. The modern passenger ship with its long passageways of dry and highly varnished woods, presents a risk from fire which is receiving serious consideration from naval architects. A fire once started will sweep the entire length of the superstructure of a ship before life boats can be launched. Steel cabin doors may be used in connection with the steel cabin framing or partition work so that each room is a unit in itself and it would be absolutely impossible for a fire to spread from one cabin to another. Steps have already been taken by some steamship lines for the installation of fire-resisting bulkheads having metal doors. A system of this kind has already been installed by the Cunard Company in the steamship *Carmania* and the steamship *Aquatania*, which have both been equipped with fire-resisting bulkheads.

The present methods of handling steel have made it possible to produce the most artistic and refined designs. Sharp and graceful moldings are now drawn through steel rolls so that architectural designs can be followed in the paneling and the decoration of dining saloons, cabins, and public rooms. The beautiful graining of the handsomest and rarest woods can be so successfully imitated that the most exacting connoisseur can not distinguish between the actual wood and the steel. Beautiful finishes in plain harmonious colors like cream white, French grays, blues, and mottled effects are possible. The manufacture of steel furniture has been so perfected that all private cabins and public rooms can be fitted out with steel wardrobes, chests of drawers, washstands, etc., and sideboards, buffets, dining tables for public rooms are now made of steel. This class of work has been successfully installed on our battleships *Utah* and *Florida*, *Arkansas* and *Wyoming*, *Nevada* and *Oklahoma*, *Pennsylvania*, *New York*, and *Texas*; destroyers *Jarvis*, *Downs*, and *Erickson*; cruiser *Sacramento*. Several installations have been made on ships for Argentina, for England, Japan, and Russia. To gain a complete and intimate knowledge of exactly the possibilities in this particular type of work I would advise that these ships be inspected. As before stated, the installation of steel "joiner work" on ships is commercially possible. We believe, without having studied the proposition in detail, that the initial cost would be slightly more than wood, but steel unlike wood is not subject to atmospheric changes and therefore is more durable. It will neither swell, shrink, nor split, and finished properly with

baked enamels the upkeep, so far as painting is concerned, would be considerably less than it would be if air-drying paints were used. Steel furniture made by this company which has been in hard and constant use for 20 years is still as good as the day it was installed. It is evident that wooden furniture under the same conditions would have been replaced once or twice. You will find that furniture aboard both the battleships *Utah* and *Florida* has been installed about 7 or 8 years and has successfully withstood the general wear and tear encountered aboard ship.

Steel furniture is of greater value in the equipment of a ship's kitchen, pantry, and scullery, for not only is it a preventative of fire, but when finished in baked enamels it is more sanitary, more easily cleaned than any other material. However well wooden fittings may be cared for there are always joints that open up in changing temperatures and these would, with any cracks which may occur from the splitting or warping of the wood, offer a refuge for microbes which can find no lodgment on steel furniture.

You will ask, although the superstructure may be completely fire-proof, what means will be taken for the fireproofing of the cargoes in the hold of the ship. I would recommend that steel compartments be constructed, the size to be determined after a careful analysis. The partitions would run from side to side of the ship and each partition have a sufficiently wide doorway to allow the easy handling of freight and the doors to be self-closing in case of fire. These partitions would be similar, so far as their function is concerned, to fire partitions in warehouses. In addition to this I would recommend the use of a sprinkler system, same as now used in many of our factories and warehouses, or possibly a steam jet to work in each compartment would be more efficient than the sprinkler system. I would suggest that structural members used in the construction of the partition in the hold of the ship be protected by a proper thickness of asbestos which could be covered with a steel shield of thin gauge to protect it against the wear and tear which naturally would occur in handling cargoes. In this way structural members would be protected as are the columns in buildings by either concrete or terra-cotta blocks.

As to the weight of the steel "joiner work" which has been furnished for battleships I will state that Government specifications have given the weight of the various articles of wood furniture and have stipulated that the metal furniture must, in every instance, be not more in weight than the wood furniture and as much less as possible. After a careful analysis of several constructions, it has been found that it is possible to construct metal furniture in such a way that it is less in weight in most instances than the similar articles of wood furniture. This fact can be borne out by the following example:

Hardwood weighs, we will say,  $3\frac{1}{2}$  pounds per board foot, while a section of a partition 1 foot square made of two thicknesses of 20-gauge steel, with an air space of 1 inch between them and joined together laterally through the air space, will weigh about  $3\frac{1}{4}$  pounds. In a battleship a certain portion of the wood furniture weighed 59,000 pounds. The same articles of furniture providing the same accommodations made of steel weighed only 50,000 pounds, showing a gain in net weight of 9,000 pounds.

The logical conclusion of this analysis is the entire elimination of wood in the fitting and furnishing of steamships, and the steamship

companies which follow this out to its fullest extent will merit and no doubt obtain their reward in the increased patronage of the traveling public.

The SECRETARY. Is there anybody else, Capt. White?

**STATEMENT OF CAPT. GEORGE A. WHITE, ASSISTANT GENERAL MANAGER HUDSON RIVER DAY LINE, NEW YORK CITY.**

Mr. Secretary and gentlemen, I have been familiar with the passenger steamboat business in this country for a number of years. There are lots of things that are very desirable but the expense and weight are sometimes prohibitive. There are some of the companies that can bear the expense, but there are a lot of weak ones whose only excuse for living is that they can do business cheaper than the railroads. They can not go on and make more elaborate preparation.

We welcome the idea of more inspection. The 31 new inspectors we are glad to hear of. When there is a fire on any boat we all suffer from it, and we want to keep boats from having them.

I did not intend to speak of the Day Line but Mr. Olcott was a little modest in what he said about bringing up our fireproofing. From the keel of the *Washington Irving* we are absolutely fireproof up to the main deck, clear up to forward of engine and boiler rooms. There is a steel deck under the galley. The bulkheads and sides are steel. Overhead is a wooden deck, but insulated with asbestos covered with sheet iron. Farther aft partitions in the crew's quarters are 3/16-inch asbestos board. There is the same construction over the fireroom and engine span; the underside of the deck is covered with asbestos and sheet iron; the stairs and the soffits of the stairs are covered with asbestos board; and the uptake or trunk, which carries the transmission from the pilot house, is all steel.

About the steel furniture. We have to give our passengers comfortable seats going up the river. They have to sit eight or nine hours, and they would not stand for steel seats.

Another thing; our chairs are largely made of wicker work, and if they were thrown overboard they would hold up a person fairly well, as would a wooden chair or door. The life preservers are placed where anyone can reach them. They can take those life preservers and in the tepid, shallow water we run in, be as safe as though bathing on a beach. We are always near shore and generally in such shoal water that our light-draft steamers can either put a plank ashore or are in water of wading depth.

I do believe in the drill and in the fire-fighting equipment; we go away beyond the requirements of the Government. We have everything we can think of in the way of fire extinguishers and more equipment than is required in way of hose. We have inspection every day by captains. The drill is every week, but every day the captain goes over the boat and into all these "breeders," as Mr. Croker calls them, and sees that there is no rubbish lying around.

I know small lines that have had to give up insurance because they could not meet their other expenses and come out even. In the short season during which the boats run, it is a question whether they can break even. Of course, we are told never to mention expenses in coming to Washington; but I am not speaking for myself, but for a great many small companies. It must be borne in mind that these



companies can not serve the useful purpose for which they have built their boats if there are too many requirements placed upon them.

When we built our steamer *Robert Fulton* our president was insistent that it be made fireproof. We tried out everything and every device we could think of to make it fireproof; but the naval architect said, "If you want that boat to run to Albany and make the time it will be necessary to make, you can not carry all that weight." So we have the minimum amount of inflammable material and the maximum amount of fireproofing we can.

We have the greatest faith in the Aero Fire Alarm system, with which a number of our boats are equipped.

The SECRETARY. There has been reference made by a number of speakers to-day to the appointment of a committee. The thought is a very excellent one, I think; but I should like very much to have that committee, if you see fit to direct the appointment of it, looked upon perhaps a little differently from the way committees are usually looked upon—not in the sense of having more work to do, because we are all busy men, but in the sense of its very grave importance to a great industry and to the public. I think it is capable of being a great means of good; and if that committee is appointed I should like to have its members all feel that in the various services of this Department all we have in the way of experimental capacity and knowledge is at their disposal; and, therefore, in appointing that committee I wish its members to know that we are here to help them. In fact, the greatest compliment we have had in this Department in the last three years was given us by a writer in a magazine, who spoke of it as the "Department of Help." That is the way in which I should like it known.

Is it your pleasure, gentlemen, that a committee shall be appointed? All in favor will please signify by saying "Aye."

(The motion was adopted unanimously.)

The SECRETARY (continuing). Then this would be a suggestion I should like to make: That the committee should be representative of the industries here represented, both as to the work done and as to the localities in which it is done; and that there should be two representatives of this Department, merely in order that the scientific work of the Department and its marine work may be at the committee's disposal for any experimental purposes.

I should like to have it understood that through me the committee could call on any other department of the Government for any information they need. I am sure that any facts the Navy Department and the other marine departments have in their possession could be ascertained and that their assistance could be had in other directions.

This would be my suggestion as to procedure: That the minutes of to-day be written up and submitted to each gentleman for his alteration. We want to get the real thought, not the hasty speech, although I know of none that has been used. Then, if we can find the money, that should be printed and put into the hands of the gentlemen who have been here present and of others whom they may suggest. For example, Capt. Blair might like to have them sent to the members of the St. Louis association; and Capt. White has spoken of some who were not able to be here.

Then let the committee be called together at the most convenient place and determine how they can best utilize the information which has here been brought out. There has been a lot of it, I think, to-day, of various kinds. Then that would enable the committee to see whether they wanted the Bureau of Standards to try something out for them; and if it was wanted it could be arranged. We can have tests made of almost anything—any kind of material. I can arrange to have the results of the work of the forest products section placed at the disposal of the committee. They are doing things with wood that are almost like dreams—such as making silk dresses out of pine, and other things which would be of greater interest to you gentlemen. I can assure you of the complete cooperation of this Department in the broadest spirit of sympathy.

Now for a general outline. I should want to know, for example, what Mr. Dobson thought of this, and Mr. Magoun of that, and Mr. Gatewood of the other thing. I think we can do something here that will be very, very practical in its final result. That would be my general idea, subject to your approval.

How should this committee be appointed? Do you wish to appoint a committee to select a committee, or shall I take the liberty of suggesting to you some names I have here before me, with the understanding that you can throw them all over if you like?

A VOICE. I think that is the better way, Mr. Secretary.

The SECRETARY. My suggestion, then, would be the following: Mr. Taylor; Mr. Kirby; Mr. Bennis; Mr. Newman; Mr. Berry; Mr. Olcott; Mr. Myrick; Mr. Olander, of Chicago; Mr. Gillette; and Dr. Stratton, of the Bureau of Standards.

I name Dr. Stratton with especial pleasure for the reason that he has commanded a vessel. He is a good, practical seaman as well as a scientific man, and therefore understands his subject on both sides. Mr. Gillette I need not commend to you.

That is a committee which represents Boston, New York, Detroit, Washington, Cleveland, and Chicago as to locality. It represents the naval architects, the insurance men, and the operating companies; it represents labor and the law, Mr. Myrick being at least very closely connected with admiralty law, as well as the Department.

I should like very much to add, if Capt. Blair will permit me, his own name as a representative of the Mississippi River interests.

Capt. BLAIR. Mr. Secretary, it would be far better, and would please me much better, if you would put down the name of Capt. Henry W. Leyhe, the president of our association. St. Louis is his home town and he has his home office there, and he will be active and interested. He represents me.

The SECRETARY. This committee will be fairly representative of the Lake, the Mississippi River, the Hudson River, and the Sound interests, and of the shipbuilders and the naval architects. It is not exclusive, however; it can add the names of others to its membership as it sees fit.

Mr. BROCK. Mr. Secretary, there is not a friend of metal furniture on that committee.

The SECRETARY. Mr. Brock, you are going to live, are you not? I am not afraid of metal furniture suffering while you are alive, especially when Mr. Dobson is here to back you up.

A VOICE. I would suggest Mr. Goodrich because I consider him a most advanced man, especially in the line of fire protection.

The SECRETARY. It will give me pleasure to add his name.

The SAME VOICE. In the laboratory in Chicago and in the fire department he has been very active.

Mr. NEWMAN. I think Mr. Goodrich should take my place.

The SECRETARY. I do not think even he would suggest that he could do that.

I do not think this committee will call for a very serious amount of time, but for a thoughtful amount of time, so to speak. Mr. Bennis is located here in Washington. It seems to me it would be an excellent thing for this committee when it meets to make Mr. Bennis its secretary. He then would be in hourly touch with the Department and with the two members of the committee from the Department who are on it, and in that way he could save, with a minimum of work for himself, a very large amount for the committee, and any facility we have would be at his disposal.

A VOICE. Mr. Secretary, I wish you would ask that this committee meet this afternoon or evening. We ought to have a meeting to-day. I am sure I think we could have such a meeting.

The SECRETARY. So many as favor the appointment of the committee suggested, including of course Mr. Goodrich's name, the inclusion of which is a source of great satisfaction to me, will signify by saying "Aye." (The motion was adopted unanimously.) The committee may be considered as appointed, and the Chair will ask that so many of the members of the committee as are here present meet immediately at the adjournment in this room.

Is there anything further, Mr. Myrick, which occurs to you?

Mr. MYRICK. Nothing, but this: I do not express simply my personal gratification, Mr. Secretary, at the manner in which this conference has been conducted, but I am sure in what I have to say I represent the opinion of every gentleman present. We are very grateful to you for bringing us together; very grateful to you for the admirable manner in which you have conducted this conference.

The SECRETARY. I thank you very much. I have great hopes as to what may come from this. I have never been willing to believe, gentlemen, that we can not do a thing merely because it has not been done. The history of our country is full of instances to the contrary. I think we can do a great deal as a result of our meeting.

I take great pride in some of our work here because we are trying to do the things which have never been done. You will notice my handling this little thing here [displaying a vase]. It may seem a trifling thing to you but it means a great deal to a great many people. Those of you who have in your homes beautiful specimens of fine porcelains have nothing finer than this. There is no lead in the glaze; no workman is poisoned in the making of this porcelain. There is no imported material in it, and yet the great potteries of Sèvres and Germany have nothing more beautiful in the way of perfect work than this little sample, which we made here in this Department. It is just another new American industry. It has been made out of American materials. Yet a year ago it had never been done. I should like to see a new motto in this country, and that is, "Americans can."

I thank you very heartily for coming. The committee will meet at its convenience.

(Thereupon, at 4.30 o'clock p. m., the conference adjourned and the committee appointed met.)

At the request of Mr. Samuel Gompers the following telegram was incorporated in the record:

CHICAGO, May 2, 1916.

MR. SAMUEL GOMPERS,  
President American Federation of Labor,  
801 G St. NW., Wash., D. C.

Advised that hearing on Steamboat-Inspection Service will be held at Washington to-morrow at which you will be present. Earnestly request that you advocate the installation of automatic-sprinkler equipments on steamboats and other forms of vessels that are being considered at hearing mentioned. Favorable action will be of material benefit to our members and serve as one of the greatest requirements for protection of life and property. Will thank you to advise me of what developments may arise.

JOHN R. ALPINE.









Stockton, Calif.



